METHODIST
COLLEGE OF ENGINEERING & TECHNOLOGY
Accredited by NAAC with A+ and NBA
Estd : 2008 Affliated to Osmania University & Approved by AICTE

DEPARTMENT OF MECHANICAL ENGINEERING

RULES & REGULATIONS

Scheme of Instruction &Examination

(Autonomous M.E CAD/CAM Curriculum for the Academic Years 2021-2022)

and

Syllabus

M.E. I Semester of

Two Year Post Graduate Degree

Programme in

Mechanical Engineering

Specialization in

CAD/CAM

(With effect from the academic year 2021– 2022)

Methodist college of Engineering and Technology

Affiliated by Osmania University Hyderabad, approved by AICTE, New Delhi,

King Koti Road, Abids, Hyderabad, Telangana 500001

1. ELIGIBILITY FOR ADMISSION

An applicant for admission into the M.E. Programme shall have one of the following qualifications:

- A Bachelor's degree in Engineering/Technology of Osmania University or any other qualification which is recognized as equivalent to the Bachelor's degree in Engineering/Technology of Osmania University
- AMIE degree or similar qualification recognized by the UPSC as equivalent to B.E./B.Tech.
- For M.E(Mechanical) programme with specialization in CAD/CAM, candidates with B.E./B.Tech in Mechanical/Production/Automobile/Mechatronics Engineering are eligible

2. ADMISSION PROCESS

The candidates will be admitted strictly in accordance with the merit secured at the PGECET, the Entrance Examination conducted by the State Government of Telangana, strictly adhering to the rules in force regarding the reservations of seats to various categories of candidates. Seats in each Programme in the Institute are made under two categories i.e., Category – A and Category – B as per the GOs.

2.1 Category – A Seats

- 70% of the sanctioned seats shall be filled through counselling as below.
  - The Convener, PGECET appointed by TSCHE will conduct the counselling for admission to PG programme based on GATE score.
  - After exhausting the eligible GATE qualified candidates, remaining seats will be filled with non-GATE candidates based on the merit at the Entrance Test conducted by the Convener, PGECET
  - No full-time employee shall be admitted to the M.E. Course unless he/she shows proof of having taken leave for the period of the course.

2.2 Category – B Seats

30% of sanctioned seats shall be filled by the Institute as per the GOs issued by the Government of Telangana from time to time.

3. PROGRAMME DURATION

- The duration of M.E. Programme is 4 (2 years) semesters. The total period of study for the purpose of drawing the scholarship amount (if eligible) shall not exceed 24 months. Each semester shall have 16 weeks of instruction.
- As per UGC Guidelines, the maximum duration for completing all the requirements for obtaining the M.E. Programme shall be (N+2) years of study from the date of admission, where 'N' is the stipulated period of study.

4. SCHEME OF INSTRUCTION AND EXAMINATION

- M.E Programme consists of Theory Courses, Laboratory Courses, Dissertation and Seminar etc
- The performance of a student in each semester shall be evaluated course wise with a maximum of 100 marks for theory and 100 marks for practical Courses.

- Performance in each course of study shall be evaluated based on (i) Continuous Internal Evaluation (CIE) throughout the semester and (ii) Semester End Examination (SEE) at the end of the semester.
- Appearance in End Semester Examination is mandatory for all Courses including theory, laboratory and Dissertation work.
- The evaluation shall be based on Outcome Based Education (OBE). For both Theory and Laboratory courses out of 100 marks, 40 marks will be awarded through continuous internal evaluation and 60 marks for semester end examination.
- Out of 40 marks for Continuous Internal Evaluation (CIE), 25 will be awarded for internal tests. Two internal tests are conducted in each semester and the average is considered as internal test marks. 15 marks will be awarded to assignments and technical Seminars and regularity in class work**.** For students having more than 90% of attendance 5 marks may be added.
- The SEE shall be conducted at the end of semester for a total of 60 marks of 3 hours duration. The syllabus for the theory Courses shall be divided into FIVE units and each unit carries equal weightage in terms of marks distribution.

4.1 Question paper pattern for SEE (60Marks) shall be as follows:

PART-A: 5 X 2 M = 10 M

- There shall be one question from each unit.
- All questions are compulsory.

PART-B: 5 X 10 M = 50 M

- There shall be 8 questions - one question from each of the five units and 6^{th} question covering 1^{st} and 2^{nd} units, 7th question covering 3^{rd} and 4^{th} units and 8^{th} question covering 5^{th} unit and any other units from 1 to 4 having more weightage. 5 questions are to be answered out of the eight and each question carries 10 marks.
- There could be a maximum of three sub divisions in each of the 8 questions in Part B.
- Course Outcome, Blooms Taxonomy levels and Maximum marks are to be indicated against each question both in CIE and SEE question paper

5. RULES AND REGULATION OF ATTENDANCE

i. A regular course of study for eligibility to appear for any course for which an examination is conducted at the end of the semester shall mean putting in an attendance of not less than 75% in each of the course registered during that semester and registering for the examination.

ii. However, in special cases and for sufficient causes shown, the Principal on the recommendation of the Head of the Department may condone the deficiency of not exceeding 10% attendance for ill-health when an application made for such a condonation is supported by a medical certificate issued by an authorized medical officer. Absence not exceeding two weeks, for activities like N.S.S., Inter University

Competitions and debates will be condoned if the candidate is sponsored by the College for such activities.

iii. If a candidate fails to secure the minimum attendance required in a **course**, then he/she **shall not be eligible to appear for the Semester End Examination in that course** He/she shall be required to prosecute a regular course of study in that course again before appearing for the Semester End Examination in that course.

iv. If a candidate fails to maintain a minimum of 40% attendance in the first semester, his/her admission automatically stands cancelled and has to reappear for PGECET.

6. DISSERTATION EVALUATION PROCESS

i) The evaluation of Dissertation Phase-I consists of 100 marks, of which 50 marks will be awarded by supervisor and 50 marks will be awarded by PRC constituted by Chairperson-BOS.

ii) During Semester IV of regular programme, the candidate will continue his/her dissertation work as Dissertation phase II and complete it by the end of semester. The candidate should examine his/her dissertation work checked for plagiarism by the software available in the department. The candidate can submit his/her dissertation when the similarity index is less than 30%.

iii) The candidates who have passed all the courses and Departmental requirements have to present the Dissertation to the internal Viva-Voce Committee. The Dissertation shall be scrutinized and evaluated by the viva-voice committee consisting of the Chairperson-BoS, two Internal Examiners and Supervisor of the candidate.

iv) The Viva-Voce committee will give a comprehensive report indicating the adequacy or otherwise of the Dissertation. If candidate's Dissertation work is found inadequate by the viva-voce committee, he/she has to appear once again for the viva – voce examination. The candidate will have to revise the Dissertation as per recommendations of the vice-voce committee and submit the final copy within two weeks to the Controller of Examinations, MCET.

v) The Controller of Examinations will send the Dissertation to the External examiner as per the panel of examiners submitted by the Chairperson-BoS. After the receipt of the review report from the external examiner, it shall be referred to the chairperson-BOS for conduction of Viva-voce.

vi) Based on the recommendation of Chairperson-BOS, the examination cell in consultation with the external examiner will schedule the viva-voce. The external Viva-Voce Committee consists of the Chairperson-BoS, ME Coordinator, External Examiner and Supervisor of the candidate. The evaluation of Dissertation phase-II for maximum of 200 marks will be done as per the guidelines given below:

- 70 Marks are allocated for quality of Dissertation work covering (a) Literature review, (b) Innovation / Originality, (c) Research Methodology adopted and (d) Relevance / Practical applications.
- 70 Marks are allocated for Report writing / Documentation.
- 30 Marks are allocated for quality and clarity of presentation of Dissertation work.
- 30 Marks are allocated for candidate's performance in terms of his/her ability to defend the work, his/her ability to answer the queries raised during Viva-Voce examination and overall subject knowledge

7. PROGRAMME REQUIREMENTS

i) The course registration by the candidates should be made within one week from the date of admission for the I-semester and within one week from the date of commencement of classes for subsequent semesters.

ii) A candidate who has registered and undergone a regular course of study and fulfils the attendance requirement is eligible to register for SEE.

iii) Students who attend and fail in the SEE are permitted to register and appear in the failed subjects at the subsequent make-up examination conducted within one month from the date of declaration of the results of the main examination.

iv) Further, a student who has registered for the SEE but not appeared is not eligible to register for makeup examinations

v) A student unsuccessful at both the main and make up examination shall register again for the SEE, in the failed subjects, as and when they are conducted. Transitory regulations shall be applicable in all such cases.

vi) A student who has not registered for SEE either due to lack of attendance or otherwise shall re-register for the course/s as per the time schedules prescribed.

7.1 PRESENTATION OF SEMINAR AND DISSERTATION

i) A student is permitted for registration to Semester-III courses, if there are not more than three subjects as backlog from the previous semesters (Backlog for this purpose shall mean Theory courses / Lab courses / Seminar etc).

ii) In the event, the make-up examination results are not declared before commencement of next semester, the candidates may be permitted to register for the course(s)/ Dissertation Phase -I conditionally.

iii) During Semester-III of Regular Programme, student has to present Seminar on Dissertation topic covering progress of Dissertation.

iv) Moreover, the student is permitted for registration to Dissertation Phase-I, if he/she has completed the requirements of Mini- Dissertation.

v) However, if these criteria are not satisfied in case of any student, he/she will be permitted for registration to Dissertation Phase -I in the subsequent even semester and for Dissertation-II in the next odd Semester.

vi) A student is permitted to register for Dissertation Phase -II only if there are not more than TWO courses as backlog from the previous semesters. Backlog for this purpose shall mean Theory courses / Lab courses / Seminars/ etc...

vii) A student, who has successfully completed all the programme requirements, is eligible to submit the M.E Dissertation for its evaluation.

viii) A student who has successfully completed all the course requirements except Dissertation may be permitted to work on his Dissertation at any recognized Institution/R&D Organization with the approval of the Head of the Department and Head of the Organization where he/she wants to carryout dissertation work

ix) Students who fail to submit their Dissertation and complete the examination formalities at the end of fourth semester, need to re-register for their dissertation work in the following semester (in no case not later than the N+2) the period of course duration i.e, 4 years for Regular). They will have to pay the prescribed fee for re-

registration of Dissertation work every semester till the completion of their Dissertation work.

8. MINIMUM QUALIFYING MARKS

i)	Each Theory Course (SEE)	50%	D grade
ii)	Each Theory Course (CIE+SEE)	50%	D grade
iii)	Each Laboratory Course (CIE+SEE)	50%	D grade
iv)	Seminar/ Mini Dissertation (CIE)	50%	D Grade
v)	Dissertation Phase-I (CIE)	50%	D grade
vi)	Dissertation Phase-II (SEE)	50%	D grade

9. GRADING SYSTEM

Grades are awarded based on the combined marks secured in the Semester End Examination (SEE) (Maximum 60%) and Continuous Internal Evaluation (CIE) (Maximum 40%) as per the criteria stated in the following Table:

Academic Performance in % of marks	**Letter Grade**	**Grade Points**
≥95 and above	S+	10
≥90 and <95	S	
≥80 and < 90	A	9
≥70 and < 80	B	8
≥60 and < 70	C	7
≥50 and < 60	D	6
<50	**F**	0

* **Note:**

1. There is no grade E

- The Grade Sheet of a candidate will reflect the grade secured by him/her as per the prescribed grading criteria.
- There is no minimum marks criteria for the Continuous Internal Evaluation (CIE) for theory course(s)
- A minimum Cumulative Grade Point Average (CGPA) of 6.0 is required for the award of Degree. The consolidated Grade Sheet will reflect the credits / grade scored in each course.
- Only CGPA will be shown in the Consolidated grade sheet and Division is not shown. However the conversion table of CGPA into Division will be given on the

back side of the Consolidated memo to facilitate the students to meet the requirements of recruiters.

- Award of division: CGPA>=7.50 in single attempt is awarded with First class with Distinction (If not cleared in single attempt awarded with First class), CGPA>= 6.50 and <7.5 is awarded with FC, CGPA>=6.0 and <6.50 is awarded with second class

10. Semester Grade Point Average (SGPA) & Cumulative Grade Point Average(CGPA) Calculation:

a) A student is said to have earned credits if he/she secures letter grade 'D' and above.

b. SGPA = $$\frac{\Sigma\left[\text{Letter Grade Point} \times \text{Credits}\right]}{\Sigma\,\text{Credits}}$$

SGPA is calculated up to second decimal point.
SGPA is calculated only when all subjects in that semester are Cleared / Passed

c. CGPA = $$\frac{\Sigma\left[\left(\text{SGPA}\right) \times \left(\text{Total Credits}\right)\right]}{\Sigma\left(\text{Total Credits}\right)}$$

CGPA at a given point of Semester is calculated up to second decimal point.
CGPA is calculated only when total credits earned are equal to total credits up to a Semester in which the candidate has last appeared for Semester End Examination.

d. Grade Sheet should indicate total number of credits and total number of credits earned up to a point of Semester.

11. AWARD OF DEGREE

The degree of Master of Engineering will be awarded to a candidate who has pursued a regular program of study of two academic years as prescribed in the scheme of instruction and has passed all the examinations as prescribed in the scheme of evaluation.

12. Recounting

A candidate desires to have recounting can apply for it as per the College norms and notification of Examination Cell.

13. Challenge of Valuation

After obtaining the photocopy of the corrected answer book of the theory subjects of SEE, the candidate can go for challenge of valuation on payment of the prescribed fees. The answer book of the candidates in such cases will be referred to an examiner outside the University. In case the candidate gets the benefit in the Challenge valuation as per the rules, 90% of the fees paid by the candidate will be refunded.

14. AWARD OF RANK CERTIFICATE/GOLD MEDAL

(a) A student securing highest CGPA in **single attempt** is eligible for award of Rank Certificate/Gold Medal.

(b) A readmitted student is not eligible for award of Gold Medal.

15. TRANSITORY REGULATIONS

i. Whenever a Course or Scheme of Instruction is revised / modified in a particular semester/year, two more examinations immediately following thereafter shall be conducted according to the old syllabus/regulations, provided the content in the course has changed more than 40%.

ii. Candidates not appearing at the examinations or failing in them shall take the examination subsequently according to the revised syllabus and regulations.

16. MALPRACTICES

The punishment to be awarded for Malpractices committed by the students in the SEE is as same as that formulated for BE programme.

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Accredited by NAAC with A+ and NBA for UG Courses
College Code: 1607

DEPARTMENT OF MECHANICAL ENGINEERING

Scheme of Instruction, Examination & Syllabus
of
M.E. I to IV Semester

(Autonomous M.E CAD/CAM Curriculum for the Academic Years 2021-2023)

Two Year Post Graduate Degree Programme in

Mechanical Engineering
Specialization in CAD/CAM

(With effect from the academic year 2021– 2022)
(As approved in the BOS meeting held on 02-10-2021)

Methodist college of Engineering and Technology

Affiliated by Osmania University Hyderabad, approved by AICTE, New Delhi,

King Koti Road, Abids, Hyderabad, Telangana 500001

Chairperson Board of Studies
Department of Mechanical Engg.
Methodist College of Engg. & Tech., Hyd.

Post Graduate Degree Programme

MECHANICAL ENGINEERING

General, Course Structure & Scheme
&
Semester-wise credit distribution

A. Definition of Credit:

1 Hour Lecture (L) per week	1 credit
1 Hour Tutorial (T) per week	1 credit
1 Hour Practical (P) per week 2 Hours Practical (Lab) per week	0.5 credits 1 credit

B. Structure of M.E. CAD/CAM

S. No.	Category	SEM-I	SEM-II	SEM-III	SEM-IV	Total Credits	OU
1	**PC**: Program Core	10	08	-	-	18	15
2	**PE:** Professional Elective	03	03	06	-	12	15
3	**OE**: Open Elective	-	03	-	-	03	03
4	**AD**: Audit Course	00	00	-	-	00	00
5	**MC**: Mandatory Course	03	-	-	-	03	03
6	Innovative Design project	-	04	-	-	04	02
7	Dissertation phase-I	-	-	10	-	10	10
8	Dissertation phase-II	-	-	-	14	14	16
9.	Labs	01	2	-	-	03	03
10.	Seminar	01	-	-	-	01	01
TOTAL		**18**	**20**	**16**	**14**	**68**	**68**

SCHEME OF INSTRUCTION & EXAMINATION
M.E. (Mechanical Engineering) I – Semester
Specialization in CAD/CAM

S. No.	Course Type/Code	Course Name		Scheme of Instruction				Scheme of Examination			Credits
				L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Courses		Code	Course Title								
1	Program Core – I	6PC5101ME	Finite Element Techniques	3	1	-	4	40	60	3	4
2	Program Core – II	6PC5102ME	Computer Integrated Manufacturing	3	-	-	3	40	60	3	3
3	Program Core – III	6PC5103ME	Computer Aided Modeling And Design	3	-	-	3	40	60	3	3
4	Elective-I	PE-I	Professional Elective – I	3	-	-	3	40	60	3	3
5	MC	6MC5101ME	Engineering Research Methodology	3	-	-	3	40	60	3	3
6	Audit-I	AD-I	Audit Course – I	-	-	2	2	40	60	2	-
Practical/ Laboratory Courses											
7	Lab-I	6PC5151CD	Finite Element Techniques Lab	-	-	2	2	40	60	3	1
8	Seminar	6PC5154CD	Seminar	-	-	2	2	50	-	2	1
Total				**15**	**01**	**06**	**22**	**330**	**420**	**22**	**18**

PC: Program Core **PE:** Professional Elective **OE**: Open Elective **AD**: Audit Course
MC: Mandatory Course **HS**: Humanities and social science

L: Lecture **T**: Tutorial **P**: Practical **D**: Drawing
CIE: Continuous Internal Evaluation **SEE:** Semester End Examination

Professional Elective-1		
S. No.	**Course Code**	**Course Title**
1	6PE5101ME	Additive Manufacturing Design and Applications
2	6PE5102ME	Advanced Metrology
3	6PE5103ME	Failure Analysis and Design
4	6PE5104ME	Design for Manufacture

Audit Course-I		
S. No.	**Course Code**	**Course Title**
1	6AD5101HS	English for Research Paper Writing
2	6AD5102CE	Disaster Management
3	6AD5103HS	Sanskrit for Technical Knowledge
4	6AD5104HS	Value Education

SCHEME OF INSTRUCTION & EXAMINATION
M.E. (Mechanical Engineering) II Semester
Specialization in CAD/CAM

S. No.	Course Type/Code	Course Name		Scheme of Instruction				Scheme of Examination			Credits
				L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Courses		Code	Course Title								
1	Program Core – IV	6PC5204ME	Computer Aided Production Management	3	1	-	4	40	60	3	4
2	Program Core – V	6PC5205ME	Automation	3	1	-	4	40	60	3	4
3	Elective-II	PE-II	Professional Elective – II	3	-	-	3	40	60	3	3
4	Open Elective	OE-I	Open Elective – I	3	-	-	3	40	60	3	3
5	Audit-II	AD-II	Audit Course – II	2	-	-	2	40	60	3	-
6	Mini project	6PC5255ME	Innovative Design Project	-	-	8	8	50	-	3	4
Practical/ Laboratory Courses											
7	Lab-II	6PC5252CD	Advanced CAD Lab	-	-	2	2	40	60	3	1
8	Lab-III	6PC5253CD	CAM &Automation Lab	-	-	2	2	40	60	3	1
Total				**14**	**02**	**12**	**28**	**330**	**420**	**24**	**20**

PC: Program Core **PE:** Professional Elective **OE**: Open Elective **AD**: Audit Course
MC: Mandatory Course **HS**: Humanities and social science

L: Lecture **T**: Tutorial **P**: Practical **D**: Drawing
CIE: Continuous Internal Evaluation **SEE:** Semester End Examination

Professional Elective-II		
S. No.	**Course Code**	**Course Title**
1	6PE5205ME	Advanced Machine Design
2	6PE5206ME	Optimization Techniques
3	6PE5207ME	Computational Fluid dynamics
4	6PE5208ME	Mechanics of composite materials

Audit Course-II		
S. No.	**Course Code**	**Course Title**
1	6AD5205HS	Constitution of India and Fundamental Rights
2	6AD5206HS	Pedagogy Studies
3	6AD5207HS	Stress Management by Yoga
4	6AD5208HS	Personality Development through life Enlightenment Skills

Open Elective-I		
S. No.	**Course Code**	**Course Title**
1	6OE5201ME	Cost Management of Engineering Projects
2	6OE5202ME	Business Analytics
3	6OE5203ME	Embedded System Design
4	6OE5204ME	Waste to Energy
5	6OE5205ME	Intellectual Property Rights &Copy Writing

SCHEME OF INSTRUCTION & EXAMINATION
M.E. (Mechanical Engineering) III – Semester
Specialization in CAD/CAM

S. No.	Course Type/Code	Course Name		Scheme of Instruction				Scheme of Examination			Credits
				L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Courses		Code	Course Title								
1	Elective-III	PE-III	Professional Elective – III	3	-	-	3	40	60	3	3
2	Elective-IV	PE-IV	Professional Elective – IV	3	-	-	3	40	60	3	3
3	Project Dissertation	6PC5356ME	Dissertation Phase – I	-	-	20	20	100	-	3	10
Total				**06**	**-**	**20**	**26**	**180**	**120**	**9**	**16**

M.E. (Mechanical Engineering) IV – Semester
Specialization in CAD/CAM

S. No.	Course Type/Code	Course Name	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Courses										
1	6PC5457ME	Dissertation Phase – II	-	-	28	28	-	200	3	14
Total			**-**	**-**	**28**	**28**	**-**	**200**	**3**	**14**

PC: Program Core **PE:** Professional Elective **OE**: Open Elective **AD**: Audit Course
MC: Mandatory Course **HS**: Humanities and social science

L: Lecture **T**: Tutorial **P**: Practical **D**: Drawing
CIE: Continuous Internal Evaluation **SEE:** Semester End Examination (Univ. Exam)

Finite Element Techniques

Semester I	**L**	**T**	**P**	**Credits**
Subject code - 6PC5101ME	**3**	**1**	**0**	**4**

Course Objectives:	**Course Outcomes**:
➢ To understand the theory and application of the finite element method for analyzing structural systems ➢ To learn Approximation theory for structural problems as the basis for finite element methods ➢ To learn formulations for a variety of elements in one, two and three dimensions ➢ To understand modeling and analysis of structures using planar, solid, and plate elements	**After completion of the course, the student will be able to** 1. Evaluate the shape functions, stiffness matrices and finite element equations. 2. Analyze the behavior of the trusses and frames. 3. Determine the finite element equations for structural problem. 4. Determine the thermal behavior of different systems. 5. Evaluate the dynamic behavior of the systems

UNIT-I:

Finite Element Methods-Review

Introduction to Finite Element. Stress and Equilibrium. Boundary conditions. Strain-Displacement relations. Stress-strain relations. One Dimensional Problem: Finite element modeling. Local, natural and global coordinates and shape functions. Potential Energy approach. Assembly of matrices. Finite element equations, treatment of boundary conditions.

UNIT-II:

Analysis of trusses and frames

Analysis of plane truss. Analysis of frames with two translations and a rotational degree of freedom at each node. Introduction to different types of element. Analysis of Beams: Element stiffness matrix for two nodded, two degrees of freedom per node for beam element.

UNIT-III:

Finite element modeling

Finite element modeling of two dimensional stress analysis problem with constant strain triangles and treatment of boundary conditions. Two dimensional four node isoparametric elements and numerical integration. Finite element modeling of Axi symmetric solids subjected of axi symmetric loading with triangular elements. Convergence requirements.

UNIT-IV:

Steady state heat transfer analysis:

One dimensional analysis of a fin and two dimensional conduction analysis of thin plate. Time dependent field problems: Application to one dimensional heat flow in a rod.

Dynamic analysis:

Formulation of finite element modeling of Eigen value problem for a stepped bar and beam. Evaluation of Eigen values and Eigen vectors. Analysis of a uniform shaft subjected to torsion using Finite Element Analysis.

UNIT-V: Dynamic Analysis

Finite element formulation of three dimensional problems in stress analysis. Finite Element formulation of an incompressible fluid. Potential flow problems .Introduction to plate theory. Introduction to non- linear problems and Finite Element analysis software.

References:

1. Rao S. S., (2011), The Finite Element Method in Engineering, Elsevier.
2. Tirupathi R Chandraputla and Ashok. D. Belegundu, Introduction of Finite Element in Engineering, Prentice Hall of India, 1997
3. Robert D. Cook, David S. Malkus, Michael E. Plesha, Robert J. Witt,Concepts and Applications of Finite Element Analysis, John Wiley & Sons, Incl.2002.
4. Daryl L. Logan (2011) A First Course in the Finite Element Method, Cengage Learning.

Computer Integrated Manufacturing

Semester I	L	T	P	Credits
Subject code - 6PC5102ME	3	0	0	3

Course Objectives:	Course Outcomes:
➢ To study about the need for CIM. ➢ To study the concepts of the CIM database. ➢ To study various manufacturing systems. ➢ To study the fundamental networking concepts and CIM models. ➢ To study the new trends in manufacturing systems	**After completion of the course, the student will be able to** 1. Understand the need for CIM. 2. Understand the role of database management of CIM. 3. Understand various types of CIM technologies and systems like Cellular Manufacturing, FMS 4. Understand the fundamental networking concepts that help in integrating all the important components of an enterprise. 5. Understand the concepts of lean manufacturing and agile manufacturing

UNIT-I:

Introduction to CIM: The meaning of Manufacturing, Types of Manufacturing; Basic Concepts of CIM: CIM Definition, Elements of CIM, CIM wheel, concept of technology, Evolution of CIM, Benefits of CIM, Needs of CIM: Hardware and software. Concurrent Engineering: Definition, Sequential Engineering Versus Concurrent Engineering, Benefits of Concurrent Engineering, Characteristics of concurrent Engineering, Framework for integration of Life-cycle ,Concurrent Engineering Techniques, Integrated Product Development(IPD), Product Life-Cycle Management (PLM).

UNIT-II:

CIM database and database management systems: Types, sources; Database Terminology, Database requirements, Database models, Database Management System, DBMS Architecture, Query Language, Structural Query Language (SQL): Basic structure, Data definition Language (Create, Alter, Drop, Truncate, View), Data Manipulation Language (store, retrieve, update, delete). Illustration of Creating and Manipulating a Manufacturing Database. SQL as a Knowledge Base Query Language. Features of commercial DBMS: Oracle, MySQL, SQLAccess, Sybase, DB2.

UNIT-III :

Cellular Manufacturing: Design of Cellular Manufacturing Systems, Cell Formation Approaches: Machine– Component Group Analysis, Similarity Coefficients-Based Approaches. Evaluation of Cell Design. Shop-floor Control: Data Logging and Acquisition, Automated Data Collection, Programmable Logic Controllers, Sensor Technology.

Flexible Manufacturing Systems: Physical Components of an FMS. Types of Flexibility, Layout Considerations: Linear Single Machine Layout, Circular Machine Layout, Cluster Machine Layout, Loop Layout; Operational Problems of FMS. FMS benefits.

UNIT-IV:

Enterprise Wide Integration in CIM: Introduction to Networking, Principles of Networking, Network Terminology, Types of Networks: LAN, MAN, WAN; Selection of Network Technology, Communication medium, Network Topology, Medium access control Methods, Signalling methods; Network Architectures and Protocols: OSI Model, MAP & TOP, TCP/IP, Network Interconnection and Devices, Network Performance. Framework for Enterprise-wide Integration.

CIM Models: ESPRIT-CIMOSAModel, NIST-AMRFModel, Siemens Model of CIM, Digital Equipment Corporation Model, IBM Concept of CIM.

UNIT-V:

Future Trends in Manufacturing Systems: Lean Manufacturing: Definition, Principles of Lean Manufacturing, Characteristics of Lean Manufacturing, Value of Product, Continuous Improvement, Focus on Waste, Relationship of Waste to Profit, Four Functions of Lean Production, Performance Measures, The Supply Chain, Benefits of Lean Manufacturing. Introduction to Agile and Web Based Manufacturing systems.

References:

1. Alavudeen,Venkateshwaran:"ComputerIntegratedManufacturing", Prentice HallIndia.
2. Mikell P. Groover, Automation, Production Systems and Computer Integrated Manufacturing, Pearson Education; Fourth edition .
3. P. Radhakrishnan, S. Subramanyam: CAD/CAM/CIM, New Age International.
4. S. Kant Vajpayee: Principles of Computer Integrated Manufacturing, Prentice-Hall India.

Computer Aided Modeling and Design

Semester I	**L**	**T**	**P**	**Credits**
Subject code -6PC5103ME	**3**	**0**	**0**	**3**

Course Objectives:	**Course Outcomes**:
➢ Study the basics of computer aided design ➢ Study the concept of geometric transformations , ➢ Study the knowledge on design process ➢ Study concept of wireframe and surface entities ➢ Study various advanced modelling concepts	**After completion of the course, the student will be able to** 1. Understand the design process, visualize models through graphics standards, and apply principles of computer graphics like geometric transformations. 2. Develop mathematical models to represent curves. 3. Develop mathematical models to represent surfaces. 4. Explain different solid modelling techniques 5. Understand the various advanced modelling concepts.

UNIT-I:

Introduction to CAD: Criteria for selection of CAD workstations, Shigle Design Process, Design criteria, Geometric modeling, entities, 2D & 3D Primitives.

2D & 3D Geometric Transformations: Translation, Scaling, Rotation, Reflection and Shearing, concatenation.

Data exchange formats: IGES, PDES, STL, STEP

UNIT-II:

Wire frame modeling: Curves: Curve representation. Analytic curves – lines, Circles, Ellipse, Conis. Synthetic curves – Cubic, Bezier, B-Spline, NURBS.

UNIT-III :

Surface Modeling: Surface entities, Surface Representation. Analytic Surface – Plane Surface, Ruled Surface, Surface of Revolution, Tabulated Cylinder. Synthetic Surface-Cubic, Bezier, B- spline, Coons.

UNIT-IV:

Solid Modeling Techniques: Graph Based Model, Boolean Models, Instances, Cell Decomposition & Spatial – Occupancy Enumeration, Boundary Representation (B-rep) & Constructive Solid Geometry (CSG).

UNIT-V:

Advanced Modeling Concepts: Feature Based Modeling, Assembling Modeling, Behavioral Modeling, Conceptual Design & Top Down Design,Generative design .

References:

1. Ibrahim Zeid, CAD/CAM, Theory and Practice, McGraw Hill, 2nd edition (25 June 2009)
2. Martenson, E. Michael, Geometric Modelling, John Wiley & Sons, 1995.
3. Nanua Singh: Systems Approach to Computer Integrated Design and Manufacturing- John Wiley.
4. Hill Jr, F.S., Computer Graphics using open GL, Pearson Education, 2003.

Additive Manufacturing Design and Applications

Semester I	**L**	**T**	**P**	**Credits**
Subject code -6PE5101ME	**3**	**0**	**0**	**3**

Course Objectives:	**Course Outcomes**:
➢ To understand the fundamentals for additive manufacturing and how it is different and discuss about various types of liquid based, solid based and powder based AM technologies. ➢ To understand the various types of Pre-processing, processing, post-processing errors in AM. Also to know the various types of data formats and software"s used in AM. ➢ To know the various applications of AM in design analysis, aerospace, automotive, biomedical and other fields.	**After completion of the course, the student will be able to** 1. Understand the fundamentals of prototyping and automated processes. 2. Analyze the utility and application of liquid and solid based AM systems. 3. Understand the concepts of powder based AM systems and Rapid tooling 4. Utilize the AM software"s and Data formats. 5. Utilize the AM for various practical applications.

UNIT-I

Introduction: Prototyping fundamentals: Need for time compression in product development, Need for Additive Manufacturing, Historical development, Fundamentals of Additive Manufacturing, AM Process Chain, Advantages and Limitations of AM, Commonly used Terms, Classification of AM process, Fundamental Automated Processes: Distinction between AM and CNC, other related technologies.

UNIT-II

Liquid-based AM Systems: Stereo lithography Apparatus (SLA): Models and specifications, Process, working principle, photopolymers, photo polymerization, Layering technology, laser and laser scanning, Applications, Advantages and Disadvantages, Case studies. Solid ground curing (SGC): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies. Polyjet: Process, Principle, working principle, Applications, Advantages and Disadvantages, Case studies. Micro fabrication.

Solid-based AM Systems: Laminated Object Manufacturing (LOM): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies. Fused Deposition Modeling (FDM): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies. Multi-Jet Modeling (MJM): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies.

UNIT-III

Powder Based AM Systems: Selective laser sintering (SLS): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies. Three dimensional

Printing (3DP): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies. Laser Engineered Net Shaping (LENS): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies. Electron Beam Melting (EBM): Models and specifications, Process, working principle, Applications, Advantages and Disadvantages, Case studies

Rapid Tooling: Introduction to Rapid Tooling (RT), Conventional Tooling Vs RT, Need for RT. Rapid Tooling Classification: Indirect Rapid Tooling Methods: Arc Spray Metal Deposition, Investment Casting, Sand Casting, 3D Keltool process. Direct Rapid Tooling: Direct AIM, LOM Tools, DTM Rapid Tool Process, EOS Direct Tool Process and Direct Metal Tooling using 3DP

UNIT-IV

AM Data Formats: Reengineering for Digital Representation, STL Format, STL File Problems, Consequence of Building Valid and Invalid Tessellated Models, STL file Repairs: Generic Solution, Other Translators, Newly Proposed Formats. Mesh Refining by Sub Division Techniques.

AM Software's: Need for AM software, Features of various AM software"s like Magics, Mimics, Solid View, View Expert, 3 D View, Velocity 2, Rhino, STL View 3 Data Expert and 3 D doctor, SurgiGuide, 3- matic, Simplant, MeshLab.

Design for AM:AM technology selection ,Build strategies ,Minimum feature size, Surface finish, Elimination of support structures, Guidelines for internal geometry like flow paths, cooling channels, cavities and others, Guidelines for making lightweight objects, Guidelines for making functionally gradient objects

UNIT-V

AM Applications: Application – Material Relationship, Application in Design, Application in Engineering, Analysis and Planning, Aerospace Industry, Automotive Industry, Jewelry Industry, Coin Industry, GIS application, Arts and Architecture. RP Medical and Bioengineering Applications: Planning and simulation of complex surgery, Customised Implants & Prosthesis, Design and Production of Medical Devices, Forensic Science and Anthropology, Visulization of Biomolecules. Web Based Rapid Prototyping Systems.

References:

1. Rapid prototyping: Principles and Applications - Chua C.K., Leong K.F. and LIM C.S, World Scientific Publications, Third Edition, 2010.
2. Rapid Manufacturing – D.T. Pham and S.S. Dimov, Springer, 2001
3. Wholers Report 2000 – Terry Wohlers, Wohlers Associates, 2000
4. Rapid Prototyping & Engineering Applications – Frank W. Liou, CRC Press, Taylor & Francis Group, 2011.

Advanced Metrology

Semester I	**L**	**T**	**P**	**Credits**
Subject code -6PE5102ME	**3**	**0**	**0**	**3**

Course Objectives:	**Course Outcomes**:
➢ To learn the concepts, relate to measurements. ➢ To study about the gauges and comparators. ➢ To learn about measuring machines, thread measurement and forms of errors caused during surface measurement.	**After completion of the course, the student will be able to** 1. Understand the measurement and calibration standards. 2. Analyze the utility and application of gauges and comparators. 3. Understand the concepts of measuring machines. 4. Determine the form errors. 5. Understand the details of measurement of different parameters of screw threads.

UNIT-I

End & line standards for length, Airy & Bessel points, desirable features of end standards, slip gauge manufacture, calibration of end standards by interferometry. NPL gauge interferometer, calibration of line standards by micrometer microscope – superposition, coincidence and symmetric straddling, photoelectric microscope and Moir fringe techniques, measurement of large displacements using lasers, calibration of Tomlinson gauges by interferometer. Photoelectric Autocollimator, calibration of polygons & circular scales. Types of interchangeability, dimensional chains.

UNIT-II

Fixed & Indicating Gauges: Taylor‟s principles of gauge design, limitations of ring & plug gauges, position and receiver gauges, types of indicating gauges. Comparators: Multirange Sigma comparator, Back pressure and free flow type pneumatic comparators, Differential back pressure gauge, usage of different types of jets, contact & non-contact tooling. Amplification selection. Air to electric transducer, Differential transducer, Variation transducer, Preprocess, In-process & Post process gauging, computation & match gauging. Usage of LVDT & Capacitive type gauge heads, Automatic inspection.

UNIT-III

Measuring Machines: Floating carriage diameter measuring m/c. Universal measuring m/c. Matrix internal diameter measuring machine. Optical dividing head. Coordinate measuring machine, Optical projector-light beam systems, Work tables, measurement techniques, fixturing & accessories. Sources of error in measurement. Design principles of measuring machines Abbe‟s rule, Kelvin coupling, flexible steel strip, advantages & limitations of hydrostatic & aerostatic bearings.

UNIT-IV

Form Errors: Evaluation of straightness & flatness, usage of beam comparator, evaluation of roundness

– intrinsic & extrinsic datums. Talyrond. PGC, RGC, MZC & LSC, methods, roundness evaluation for even & odd number of lobes. Surface Finish: stylus instrument (TALYSURF). M & E Systems, numerical assessment, vertical & horizontal descriptors, profile as a random process, usage of interferograms. Plastic replica technique.

UNIT-V

Screw Threads: Measurement of thread elements for internal & external threads, progressive periodic, drunkenness and irregular pitch errors. NPL pitch measuring machine, virtual effective diameter, thread gauging. Gears: measurement of tooth thickness, involute profile, pitch, concentricity and alignment, rolling gear test.

References:

1. R.K. Jain, Engineering Metrology, Khanna Publishers
2. I.C. Gupta, A Text Book of Engineering Metrology, Dhanpat Rai & Sons.
3. Mahajan, M, A Text Book of Metrology. 2010. Dhanpat Rai& Co (P) Ltd, ISBN 13 : 978-817700051
4. ASTME, Hand Book of Industrial Metrology, Prentice Hall of India Pvt Ltd

Failure Analysis and Design

Semester I	**L**	**T**	**P**	**Credits**
Subject code - 6PE5103ME	**3**	**0**	**0**	**3**

Course Objectives:	**Course Outcomes**:
➢ To explain the importance of Good design and various factors affecting it ➢ To explain the importance of Ergonomics and Aesthetics in good design. ➢ To understand the importance of various scientific methods available to solve problems arising from product initiation state to product delivery state. ➢ To understand the phenomenon & importance of Fracture, its determination by various methods also understand the effect of fatigue on crack propagation.	**After completion of the course, the student will be able to** 1. Understand the design fundamentals. 2. Analyze the utility and application of different design methods. 3. Understand the concepts of fracture mechanics. 4. Understand the service failure analysis. 5. Understand the concepts related to fatigue crack propagation.

UNIT - I

Introduction: Role of failure prevention analysis in mechanical design, Modes of mechanical failure, Review of failure theories for ductile and brittle materials including Mohr‟s theory and modified Mohr‟s theory, Numerical examples. Fatigue of Materials: Introductory concepts, High cycle and low cycle fatigue, Fatigue design models, Fatigue design methods, Fatigue design criteria, Fatigue testing, Test methods and standard test specimens, Fatigue fracture surfaces and macroscopic features, Fatigue mechanisms and microscopic features

UNIT - II

Stress-Life (S-N) Approach: S-N curves, Statistical nature of fatigue test data, General S-N behavior, Mean stress effects, Different factors influencing S-N behavior, S-N curve representation and approximations, Constant life diagrams, Fatigue life estimation using S-N approach. Strain-Life(å-N)approach: Monotonic stress-strain behavior, Strain controlled test methods, Cyclic stress-strain behavior, Strain based approach to life estimation, Determination of strain life fatigue properties, Mean stress effects, Effect of surface finish, Life estimation by å-N approach

UNIT – III

Fracture mechanics: Introduction, Modes of fracture failure Griffith Analysis, Energy release rate, Energy release rate of DCB specimen; Stress Intensity Factor: SIF„s for edge and centre line crack, Fracture toughness, Elastic plastic analysis through J-integral method: Relevance and scope, Definition of J-integral, Path independence, stress strain relation, Strain Energy Release RateVs J-integral. Failure analysis and determination of stress patterns from plastic Flow observations Dynamic loading– Fracture types in tension

UNIT – IV

Applications of fracture mechanics: Introduction –Through cracks emanating from holes – Corner

cracks at holes – Cracks approaching holes-Combined loading-Fatigue crack growth binder- Mixed mode loading-Fracture toughness of weld metals-Service failure analysis

UNIT – V

Fatigue crack propogation: Mechanism of fatigue crack initiation, propagation and growth, Fatigue data representation, Factors influencing Fatigue strength, Fatigue life prediction, prevention of fatigue failures, corrosion fatigue. Cumulative fatigue damage

References:

1. Ibrahim Dieter, George E., Engineering Design - A Materials and Processing Approach, McGraw Hill, International Editions, Singapore, 2000.
2. Pahl, G, and Beitz, W., Engineering Design, Springer Verlag, NY. 1984.
3. Prashant Kumar, Elements of Fracture Mechanics, Wheeler Publishing, 1999.
4. S T. Rolfe and J M Barsom, Fracture and Fatgue control in structure, Prentice Hall.

Design for Manufacture

Semester I	**L**	**T**	**P**	**Credits**
Subject code - 6PE5104ME	**3**	**0**	**0**	**3**

Course Objectives:	**Course Outcomes**:
• To study about the general design principles for manufacturability • To study process of metallic components design. • To study process of providing various shapes in metallic components design. • To study process of non-metallic components design. • To study process related to assembly of components.	**After completion of the course, the student will be able to** 1. Determine the economic use of the raw materials. 2. Understand the various secondary manufacturing aspects. 3. Understand the underlying principles in creating various shapes in metallic components 4. Determine the principles involved in non-metallic components design. 5. Analyze the economical assemblage process with the aid of computers.

UNIT-I

Introduction: General design principles for manufacturability, strength and mechanical factors, mechanisms selection, evaluation method, geometrical tolerances, tolerance control and utilization. Economic Use of Raw Materials: Ferrous steel, hot rolled steel, cold finished steel, stainless steel, non-ferrous materials aluminum, copper, brass, non-metallic materials, plastics, rubber and composites.

UNIT-II

Metallic Components Design: Metal extrusion, metal stamping, fine blanking, four slide parts, spring and wire forms, spun metal parts, cold headed parts, extruded parts, tube and section bends, rolled formed parts, power metal parts, forging electro forming parts, specialized forming methods, turned parts, machined round holes, drilled parts, milled parts.

UNIT-III

Metallic Components Design: Planned shaped and slotted parts, screw threaded contoured and internal ground parts, center less ground, electrical discharged, rolled furnished parts, electro chemical and advanced machine parts. Sand cast, die cast, investment cast and other cast products.

UNIT-IV

Non Metallic Components Design: Thermosetting plastic, injection moulded and rotational moulded parts, blow moulded, welded plastic articles, ceramics. Assembled Parts Design: Welded parts, arc, resistance, brazed and soldered parts, gear box assembly, bearing assembly.

UNIT-V

Assembled Parts Design: Retension, bolted connection, screwed connections, flanged connections, centred connections, press fitted connections, surface finishing, plated parts, heat treated parts, NC machining, group technology, low cost automation, computer aided manufacture, product design requirements. Case Studies: Identification of economical design and redesign for manufacture.

References:

1. James G. Bralla, ―Hand book of product design for manufacturing‖ McGraw Hill Co., 1986
2. K.G. Swift ―Knowledge based design for Manufacture‖, Kogan page Limited, 1987.
3. Boothroyd, G, Heartz and Nike, Product Design for Manufacture, Marcel Dekker, 1994.
4. Dickson, John. R, and Corroda Poly, Engineering Design and Design for Manufacture and Structural Approach, Field Stone Publisher, USA, 1995.

Engineering Research Methodology

Semester I	**L**	**T**	**P**	**Credits**
Subject code – 6MC5101ME	**3**	**0**	**0**	**3**

Course Objectives:	**Course Outcomes**:
➢ To learn the research types, methodology and formulation. ➢ To know the sources of literature, survey, review and quality journals. ➢ To understand the research design for collection of research data. ➢ To understand research data analysis, writing research reports and grant proposals.	**After completion of the course, the student will be able to** 1. Demonstrate the knowledge of research processes and define a research problem. 2. Conduct literature surveys for a given research problem and write a critical review. 3. Choose and apply suitable research design and propose an appropriate research plan for the chosen research problem. 4. Gain experience with data collection and sampling techniques and interpret data gathered from field studies or experiments. 5. Prepare a well written and concise research thesis / report/ proposal.

Unit - I

Research Methodology: Objectives and Motivation of Research, Types of Research, Research Approaches, Significance of Research, Research Methods verses Methodology, Research and Scientific Method, Important of Research Methodology, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India, Benefits to the society in general. Defining the Research Problem: Definition of Research Problem, Problem Formulation, Necessity of Defining the Problem, Technique involved in Defining a Problem.

Unit - II

Literature Survey: Importance of Literature Survey, Sources of Information, Assessment of Quality of Journals and Articles, Information through Internet. Literature Review: Need of Review, Guidelines for Review, Record of Research Review.

Unit - III

Research Design: Meaning of Research Design, Need of Research Design, Feature of a Good Design Important Concepts Related to Research Design, Different Research Designs, Basic Principles of Experimental Design, Developing a Research Plan, Design of Experimental Set-up, Use of Standards and Codes.

Unit - IV

Data Collection: Collection of primary data, Secondary data, Data organization, Methods of data grouping, Diagrammatic representation of data, Graphic representation of data. Sample Design, Need for sampling, some important sampling definitions, Estimation of population, Role of Statistics for Data Analysis, Parametric V/s Non Parametric methods, Descriptive Statistics, Measures of central tendency and Dispersion, Hypothesis testing, Use of Statistical software. Data Analysis: Deterministic and random data, Uncertainty analysis, Tests for significance: Chi-square, student‟s t-test, Regression modeling, Direct and Interaction effects, ANOVA, F-test, Time Series analysis, Autocorrelation and Autoregressive modeling.

Unit – V

Research Report Writing: Format of the Research report, Synopsis, Dissertation, Thesis its Differentiation, References/Bibliography/Webliography, Technical paper writing/Journal report writing, making presentation, Use of visual aids. Research Proposal Preparation: Writing a Research Proposal and Research Report, Writing Research Grant Proposal

References:

1. C.R Kothari, Research Methodology, Methods & Technique‖; New Age International Publishers, 2004
2. R. Ganesan, Research Methodology for Engineers‖, MJP Publishers,2011.
3. Vijay Upagade and Aravind Shende, Research Methodology, S. Chand & Company Ltd., New Delhi, 2009
4. G. Nageswara Rao, Research Methodology and Quantitative methods, BS Publications, Hyderabad, 2012.

English for Research Paper Writing

Semester I	**L**	**T**	**P**	**Credits**
Subject code - 6AD5101HS	**2**	**0**	**0**	**0**

Course Objectives:	**Course Outcomes**:
➢ Understand that how to improve your writing skills and level of readability. ➢ Understand the nuances of language and vocabulary in writing a Research Paper. ➢ Develop the content, structure and format of writing a research paper. ➢ Produce original research papers without plagiarism.	**After completion of the course, the student will be able to** 1. Interpret the nuances of research paper writing. 2. Differentiate the research paper format and citation of sources. 3. To review the research papers and articles in a scientific manner. 4. Avoid plagiarism and be able to develop their writing skills in presenting theresearch work. 5. Create a research paper and acquire the knowledge of how and where to publish their original research papers.

UNIT - I

Academic Writing: Meaning & Definition of a research paper– Purpose of a research paper – Scope – Benefits, Limitations – outcomes.

UNIT - II

Research Paper Format: Title – Abstract – Introduction – Discussion – Findings, Conclusion – Style of Indentation – Font size/Font types – Indexing – Citation of sources.

UNIT - III

Research Methodology: Methods (Qualitative – Quantitative) Review of Literature. Criticizing, Paraphrasing & Plagiarism.

UNIT - IV

Process of Writing a research paper: Choosing a topic - Thesis Statement – Outline – Organizing notes - Language of Research – Word order, Paragraphs – Writing first draft –Revising/Editing - The final draft and proof reading.

UNIT - V

Research Paper Publication: Reputed Journals – National/International – ISSN No, No. of volumes, Scopus Index/UGC Journals – Free publications - Paid Journal publications – Advantages/Benefits

Presentation Skills: Developing Persuasive Presentations, Structure of Presentation, Presentation Slides, Presentation Delivery, role of the audience, what to search and cite, how to establish credibility.

References:

- C. R Kothari, Gaurav, Garg, ―Research Methodology Methods and Techniques‖, 4/e, New AgeInternational Publishers.
- Day R, ―How to Write and Publish a Scientific Paper**"**, Cambridge University Press, 2006
- MLA Hand book for writers of Research Papers‖, 7/e, East West Press Pvt. Ltd, New Delhi
- Lauri Rozakis, Schaum"s, Quick Guide to Writing Great Research Papers‖, Tata McGraw Hills Pvt. Ltd, New Delhi.

Disaster Management

Semester I	**L**	**T**	**P**	**Credits**
Subject code -6AD5102HS	**2**	**0**	**0**	**0**

Course Objectives:	**Course Outcomes**:
➢ To impart knowledge in students about the nature, causes, consequences and mitigation measures of the various natural disasters. ➢ To enable the students to understand risks, vulnerabilities and human errors associated with human induced disasters. ➢ To enable the students to understand and assimilate the impacts of any disaster on the affected area depending on its position/ location, environmental conditions, demographic, etc.	**After completion of the course, the student will be able to** 1. Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response. 2. Critically evaluate disaster risk reduction and humanitarian response policy and Practice from multiple perspectives. 3. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. 4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in**.** 5. Understand Repercussions of Disasters and Hazards.

UNIT-I

Introduction: Disaster: Definition, Factors and Significance; Difference between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

UNIT-II

Repercussions of Disasters and Hazards: Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem.

Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War and Conflicts.

UNIT-III

Disasters Prone Areas in India: Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics

UNIT-IV

Disaster Preparedness: Monitoring of Phenomena Triggering a Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.

UNIT-V

Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People‟s Participation in Risk Assessment. Strategies for Survival. Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.

References:

1. R. Nishith, Singh AK, “Disaster Management in India: Perspectives, issues and strategies”, New Royal Book Company.
2. Sahni, Pardeep (Eds.), “Disaster Mitigation Experiences and Reflections”, PHI, New Delhi.
3. Goel S. L., “Disaster Administration and Management Text and Case Studies”, Deep & Deep Publication Pvt. Ltd., New Delhi.
4. Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD.

Sanskrit for Technical Knowledge

Semester I	**L**	**T**	**P**	**Credits**
Subject code -6AD5103HS	**2**	**0**	**0**	**0**

Course Objectives:	**Course Outcomes**:
➢ To get a working knowledge in illustrious Sanskrit, the scientific language in the world. ➢ To make the novice Learn the Sanskrit to develop the logic in mathematics, science & other subjects. ➢ To explore the huge knowledge from ancient Indian literature.	**After completion of the course, the student will be able to** 1. Develop passion towards Sanskrit language. 2. Decipher the latent engineering principles from Sanskrit literature 3. Correlates the technological concepts with the ancient Sanskrit history. 4. Develop knowledge for the technological progress. 5. Explore the avenue for research in engineering with aid of Sanskrit.

UNIT-I

Introduction to Sanskrit Language: Sanskrit Alphabets-vowels-consonants- significance of Amarakosa- parts of Speech-Morphology-creation of new words-significance of synonyms-sandhi-samasa-sutras-active and passive Voice-Past/Present/Future Tense-Syntax-Simple Sentences (elementary treatment only)

UNIT-II

Role of Sanskrit in Basic Sciences: Brahmagupthas lemmas (second degree indeterminate equations), sum of squares of n-terms of AP- sulba, sutram or baudhayana theorem (origination of Pythagoras theorem)-value of pie-Madhava‟s sine and cosine theory (origination of Taylor's series).

The measurement system-time-mass-length-temp, Matter elasticity-optics-speed of light (origination of Michaelson and Morley theory).

UNIT-III

Role of Sanskrit in Engineering-I (Civil, Mechanical, Electrical and Electronics Engineering):

Building construction-soil testing-mortar-town planning-Machine definition-crucible-furnace-air blower- Generation of electricity in a cell-magnetism-Solar system-Sun: The source of energy, the earth-Pingala chandasutram (origination of digital logic system)

UNIT-IV

Role of Sanskrit in Engineering-II (Computer Science Engineering & Information Technology):

Computer languages and the Sanskrit languages-computer command words and the vedic command words- analogy of pramana in memamsa with operators in computer language-sanskrit analogy of physical sequence and logical sequence, programming.

UNIT-V

Role of Sanskrit in Engineering-III (Bio-technology and Chemical Engineering): Classification of plants- plants, the living-plants have senses-classification of living creatures, Chemical laboratory location and layout- equipment-distillation vessel-kosthi yanthram.

References:

1. M Krishnamachariar, History of Classical Sanskrit Literature, TTD Press, 1937.
2. M.R. Kale, A Higher Sanskrit Grammar: For the Use of School and College Students, Motilal Banarsidass Publishers, 2015.
3. Kapail Kapoor, Language, Linguistics and Literature: The Indian Perspective, ISBN- 10: 8171880649, 1994.
4. Pride of India, Samskrita Bharati Publisher, ISBN: 81-87276 27-4, 2007.

Value Education

Semester I	**L**	**T**	**P**	**Credits**
Subject code - 6AD5104HS	**2**	**0**	**0**	**0**

Course Objectives:	**Course Outcomes**:
➢ Understand the need and importance of Values for self-development and for National development. ➢ Imbibe good human values and Morals ➢ Cultivate individual and National character.	**After completion of the course, the student will be able to** 1. Gain necessary Knowledge for self-development 2. Learn the importance of Human values and their application in day to day professional life. 3. Appreciate the need and importance of interpersonal skills for successful career and social life 4. Emphasize the role of personal and social responsibility of an individual for all-round growth. 5. Develop a perspective based on spiritual outlook and respect women, other religious practices, equality, non-violence and universal brotherhood

UNIT-I

Human Values, Ethics and Morals: Concept of Values, Indian concept of humanism, human values; Values for self-development, Social values, individual attitudes; Work ethics, moral and non- moral behavior, standards and principles based on religion, culture and tradition.

UNIT-II

Value Cultivation, and Self-management: Need and Importance of cultivation of values such as Sense-of Duty, Devotion to work, Self-reliance, Confidence, Concentration, Integrity & discipline, and Truthfulness.

UNIT-III

Spiritual outlook and social values: Personality and Behavior, Scientific attitude and Spiritual (soul) outlook; Cultivation of Social Values Such as Positive Thinking, Punctuality, Love & Kindness, avoiding fault finding in others, Reduction of anger, forgiveness, Dignity of labour, True friendship, Universal brotherhood and religious tolerance.

UNIT-IV

Values in Holy Books: Self-management and Good health; internal & external cleanliness, Holy books versus Blind faith, Character and Competence, Equality, Nonviolence, Humility, Role of Women.

UNIT-V

Dharma, Karma and Guna: Concept of soul; Science of Reincarnation, Character and Conduct, Concept of Dharma; Cause and Effect based Karma Theory; The qualities of Devine and Devilish;

Satwic, Rajasic and Tamasic gunas.

References:

- Chakroborty, S.K., Values & Ethics for organizations Theory and practice, Oxford University Press,New Delhi, 1998.
- Venkataiah. N. (1998). Value Education. Delhi: APH Publishing
- Jaya Dayal Goyandaka, Srimad Bhagavad Gita with Sanskrit Text, Word Meaning and ProseMeaning, Gita Press, Gorakhpur, 2017.
- Sprod,T. (1998). Philosophical discussion in moral education, The community of ethical inquiry. Routledge – 2001-244 pages, Series: Routledge International Studies in the Philosophy of Education

Finite Element Techniques Lab

Semester I	L	T	P	Credits
Subject code -6PC5151CD	0	0	2	1

Course Objectives:	Course Outcomes:
➢ To enable the students understand the mathematical and physical principles underlying the Finite Element Method (FEM) as applied to solid mechanics and thermal analysis. ➢ Introduce students to the theory of elasticity. ➢ To teach students the characteristics of various elements in structural and thermal analysis and selection of suitable elements for the problems being solved. ➢ To introduce students to various field problems and the discretization of the problem. ➢ To make the students drive finite element equations for simple and complex elements.	**After completion of the course, the student will be able to** 1. Determine the stiffness and loading matrices for various applications. 2. Carry out structural analysis of various components. 3. Determine the bending and deflection in components. 4. Analyze static stress analysis in case of plate with a hole. 5. Analyze two dimensional heat conduction in case of a plate.

List of Experiments:

1. To determine the stiffness matrix and loading matrices in Beams.
2. To determine the B matrix, loading matrices in plane.
3. Introduction to Finite Element Analysis Software.
4. Static analysis of a corner bracket.
5. Statically indeterminate reaction force analysis. (Truss/bar element-basic).
6. Determination of Beam stresses and Deflection. (Cantilever and Simply supported beams).
7. To perform ax symmetric analysis.
8. Stress analysis using plane stress and plane strain.
9. Static analysis of plate with hole.
10. To perform 2 dimensional stress analysis in case of composite rectangular plate.
11. To perform explicit analysis of car crash.
12. To perform steady state thermal analysis of two dimensional plate

Chairperson Board of Studies
Department of Mechanical Engg.
Methodist College of Engg. & Tech., Hyd.