SHRI VENKATESHWARA UNIVERSITY

Syllabus

M.TECH - PART TIME
Mechanical Engineering
IVth SEMESTER

(Three Years Post Graduation Programme)

(w.e.f. 2019-20)

SCHOOL OF ENGINEERING & TECHNOLOGY

Mechanical Engineering

PART TIME

SEMESTER-IV

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	WME-401	Non- Traditional & Modern Machining	3	0	0	20	10	30		70		100	4
2	WME-041	Reliability	3	0	0	20	10	30		70		100	4
3	WME-411	Design Practice Lab	0	0	4				25		25	50	2
4	WME-441	MINI-PROJECT	0	0	4				50		50	100	2
		Total										350	12

Course:- M.Tech **Year/Semester:-** II/IV
Subject:- Non-Traditional & Modern Machining **Subject Code:-** WME-401
Max. Marks: a) Internal/Practical- 30
b) External- 70

Credit Hours		
L	T	P
3	0	0

Course Outcomes: At the end of the course, students will be able to

1. Analyze and study dynamics response of single degree freedom system using fundamental theory and equation of motion.
2. Analyze and study dynamics response of Multi degree freedom system using fundamental theory and equation of motion.
3. Use the available software for dynamic analysis.

Syllabus Contents:

Non Traditional Machining Processes: Importance and need, Classifications.
Mechanical Processes: Abrasive Jet Machining (AJM), Water Jet Machining (WJM)
Abrasive Water Jet Machining (AWJM): Principles of material removal, Computation of MRR, Salient process variables, equipments, applications.Ultrasonic Machining (USM): Mechanism of material removal, factors affecting material removal,equipment, transducers, different types of horn,Dimensional accuracy.
Electrochemical Processes: Electrochemical Machining (ECM): Basic mechanics of ECM, Electrochemistry & process characterization, Computation of MRR for single metal and alloys, Dynamics of ECM, ECM hydrodynamics, Operating variables, equipments and applications.
Electro-Thermal Processes: Electro-discharge machining (EDM): Principles of EDM, Process variables and characteristics, Modeling of material removal, Equipments: Types of power supply, Analysis of RC Relaxation EDM Generator, Determination of Surface roughness and over cut, Applications. Laser Beam Machining (LBM): Laser generation and types, Laser construction, Mechanism of material removal, Process characteristics of different lasers, Applications. Electron Beam Machining (EBM): Principle, Mechanism of material removal, Effect of process variables onprocess criteria, Applications. Plasma Arc Machining (PAM): Principle, Mechanism of material removal, Effect of process variables on process criteria, Applications. Ion Beam Machining (IBM) **Computer Integrated Manufacturing:** Batch Production and Mass Customization, Concept of Integrated automation, Concurrent Engineering.
CAD & CAE: Feature based Design, parametric design, Fundamentals of FEA, Role of CAD in CIM environment.
Group Technology: Need & Utility, Different types of coding, Clustering Techniques & Benefits. CAPP: Variant & Generative, Feature Recognition, Feature-Process co-relation, Application Programs in CAPP.
Computer aided quality control: Quality control, Inspection, Contact and Non-contact Inspection,Computer aided data acquisition, CMM.
FMS: Types of flexibility, FMM, FMC, Modules of FMS, Materials handling in FMS, Quantitativeanalysis in FMS, Tool Management, Automatic Tool wear monitoring, Performance evaluation.
CIM: Definition & Concept, CIM wheel, External and Internal challenges, World-class order winning criteria, Product Development Cycle. Concurrent Engineering, Design for Manufacturing& Assembly, Data base requirements in CIM, Computer Networking, CIM Implementation & Barriers.
Emerging trends in manufacturing: High speed machining, micro, meso and nano manufacturing.

Reference Books:

1. Non-Conventional Machining by P.K.Mishra, Narosa Publishers.
2. Modern machining processes by P. C. Pandey, H. S. Shan, Tata McGraw Hill.
3. Fundamentals of Machining Processes, H. El-Hofy (2007), CRC Press, Taylor and Francis Group
4. Automation, Production Systems and Computer Integrated Manufacturing by Groover, PrenticeHall.
5. Computer-Integrated Manufacturing by Rehg Kraebber, 2nd Edition, Pearson Education.
6. The Design and Operation of FMS by P. G. Ranky, IFS Ltd., U.K., North Holland.
7. Computer Integrated Manufacturing by Joseph Harrington, Industrial Press

Course:- M.Tech
Subject:- Reliability
Max. Marks: a) Internal/Practical- 30
b) External- 70

Year/Semester:- II/IV
Subject Code:- WME-041

Credit Hours		
L	T	P
3	0	0

Course Outcomes: At the end of the course, students will be able to

1. Analyse the special structures by understanding their behaviour.
2. Design and prepare detail structural drawings for execution citing relevant IS codes.

Syllabus Contents:

Elements of Probability: Probability concepts, Rules for addition of probabilities, Complementary events,Conditional probability, Random events, Sample distribution.

Reliability: Fundamental aspects of reliability, Failure patterns and mathematical models (Constant failure rate models and Time Dependent failure models), System Reliability, Fault tree analysis, FMEA and FMECA.

Reliability testing: Burn in testing, Binomial Testing, Acceptance testing, Accelerated life Testing, Degradation Models.

Reliability Improvement: Reliability specification and system measurements, System effectiveness, Economic analysis and life cycle cost, Reliability allocation (AGREE method, Redundancies).

Reliability Design Methods: Parts and material selection, De-rating, Stress-Strength analysis, Complexity and Technology, Redundancy.

References Books:

1. Mechanical Reliability Engineering by ADS Carter, Mc Milan.
2. Reliability Evaluation of Engineering Systems by Roy Bilington and R. N. Allen, Pitman.
3. Introduction to Reliability Engineering by Dhilan & Singh.
4. Reliability Engineering by L. A. Doty, Industrial Press Inc.

Course:- M.Tech **Year/Semester:-** II/IV
Subject:- Design Practice Lab **Subject Code:-** WME-411
Max. Marks: a) Internal/Practical- 25
b) External- 25

Credit Hours		
L	T	P
0	0	4

Course Outcomes: At the end of the course, students will be able to

1. To demonstrate the concepts discussed in Design of Machine Elements, Mechanical Vibrations & Dynamics of Machines courses.
2. To visualize and understand the development of stresses in structural members and experimental determination of stresses in members utilizing the optical method of reflected photo-elasticity.

Syllabus Contents:

1. Determination of natural frequency of a spring mass system.
2. Determination of natural frequency logarithmic decrement, damping ratio and damping Co-efficient in a single degree of freedom vibrating systems (longitudinal and torsional)
3. Determination of critical speed of rotating shaft.
4. Balancing of rotating masses.
5. Determination of fringe constant of Photo-elastic material using Circular disk subjected diametric compression, Pure bending specimen (four point bending)
6. Determination of equilibrium speed, sensitiveness, power and effort of Porter/Hartnell Governor.
7. Determination of pressure distribution in Journal bearing
8. 8. Experiments on Gyroscope (Demonstration only)

Course:- M.Tech **Year/Semester:-** II/IV

Subject:- Mini Project **Subject Code:-** WME-441

Max. Marks: a) Internal/Practical- 50

b) External- 50

Credit Hours		
L	T	P
0	0	4

Course Outcomes: At the end of the course, the student will be able to:

1. Identify structural engineering problems reviewing available literature.
2. Study different techniques used to analyze complex structural systems.
3. work on the solutions given and present solution by using his/her technique applying engineering principles.

Syllabus Contents:

Mini Project will have mid semester presentation and end semester presentation. Mid semester presentation will include identification of the problem based on the literature review on the topic referring to latest literature available.

End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions highlighting individuals' contribution.

Continuous assessment of Mini Project at Mid Sem and End Sem will be monitored by thedepartmental committee.