

SHRI VENKATESHWARA UNIVERSITY



Syllabus

M.TECH

Mechanical Engineering

(PART TIME)

Ist SEMESTER

(Three Years Post Graduation Programme)

(w.e.f. 2019-20)

SCHOOL OF ENGINEERING & TECHNOLOGY

Course:- M.Tech

Subject:- Advanced Engg. Math

Max. Marks: a) **Internal/Practical-** 30

b) **External-** 70

Year/Semester:- I/I

Subject Code:- WME-101

Credit Hours		
L	T	P
3	0	0

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

1. Analyze the skeleton structures using stiffness analysis code.
2. Use direct stiffness method understanding its limitations

Syllabus Contents:

- **Statistics:** Elements of statistics ; frequency distribution ; concept of mean , median, mode ; and different types of distribution ; Standard deviation and variance ; curve fitting by least square method ; Correlation and Regression ; Testing of hypothesis ; Basic types of factorial design and Analyses of Variance.
- **Matrix Operation:** Matrix Operations; Eigen value and Eigen vector by iterative methods; Diagonalisation of a square matrix. Laplace Transform, Fourier Transform; Fourier Integral and Their Applications.
- **Numerical Methods;** Interpolation by Polynomials ; Error Analysis ; Solution of system of linear equation by Gauss – Seidel iterative methods ; Newton Rap son methods ; Numerical integration by Gauss –
- **Quadrature ;** Solution of ordinary differential equation by Rayleigh – Ritz method.

References:

- Applied Abstract Algebra by Rudolf Lidl and Gunther Pilz, 2nd edition (Springer),
- Discrete Mathematics by Lipschutz (Schaums Series).

Course:- M.Tech
Subject:- Principles of Machining Process
Max. Marks: a) Internal/Practical- 30
b) External- 70

Year/Semester:- I/I
Subject Code:- WME-011

Credit Hours		
L	T	P
3	0	0

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

1. Use analytical methods for the solution of Principles of Machining Process
2. Use analytical methods for the solution of Principles of Machining Process
3. Apply the numerical techniques and tools for the Mechanics of chip formation.
4. Apply the numerical techniques and tools for the Cutting fluid and surface roughness.

Syllabus Contents:

- **Classification of Manufacturing Process:** Importance and perspective of machining process, Schematic Representation of machining system, Different types of motions to generate different shapes.
- **Mechanics of chip formation:** Orthogonal and oblique cutting, shear plane and shear strain, Computation of chip reduction coefficient, Velocity triangle, different process variables, actual feed and actual depth of cut, Different types of chips, computation of MRR for different processes.
- **Cutting tool geometry:** ASA, ORS and NRS systems, conversion from one system to others, Cutting tool nomenclature.
- **Cutting force:** Theoretical analysis of cutting force, Merchant circle diagram, Theory of Ernst and Merchant 1st and 2nd Model, Theory of Lee and Shaffer model, Ploughing force and size effect, Dynamometry, Friction in metal cutting, Cutting energy and power in metal cutting.
- **Cutting tool materials:** Properties, different types of cutting tool materials e.g. HSS, Carbides, Coated carbides, ceramics, Cermets, PCBN and Diamonds and other advanced cutting tool materials, ISO specification of modern throw away inserts.
- **Temperatures in metal cutting:** Heat generation and temperature distribution in metal cutting (Primary and secondary zone), Measurement of cutting temperature, Effect of process variables and tool geometry in temperature rise.
- **Cutting fluid and surface roughness:** Need for cutting fluid, characteristics of an efficient lubricant, Different applications: flood, jet, mist and Z-Z cooling, Cutting fluid maintenance and its disposal, Concept of dry cutting.
- **Surface roughness:** Theoretical computation of surface roughness, Measurement of surface roughness, Modification of tool geometries for improved surface finish, Effect of process variables on surface roughness.
- **Tool wear, Tool life and machinability:** Causes and mechanism of wear, Types of wear: Crater wear and flank wear, Tool life criteria, Effect of built-up-edges and tool geometries on wear, Concept of tool life, Taylor's tool life equation, Effect of process variables on tool life, Concept of machinability and machinability rating, Variables affecting machinability.
- **Abrasive processes:** Grinding, Chip removal in grinding, Cutting force in grinding, Types of abrasive and specification of grinding wheel, Effect of variables on grinding performance. Types of abrasive machining and finishing processes: honing, lapping, super finishing and buffing.

References:

- Metal Cutting Theory & Practice by A. Bhattacharya, New Central Book Agency Pvt. Ltd.
- Fundamentals of machining and machine tools by Boothroyd, G. and Knight, W. A. (2006), 3rd Edition, CRC Press, Taylor and Francis Group.
- Metal Cutting Principles, Shaw by M. C. (2005), 2nd Edition, New York: Oxford University Press.
- Principles of Engineering Manufacture, Black, S. C., Chiles, V., Lissaman A. J. and Martin, S.J. (2004) 3rd Edition, New Delhi: Viva Books Pvt. Ltd.
- Fundamentals of Machining Processes, H. El-Hofy (2007), CRC Press, Taylor and Francis Group.
- Production Technology by HMT, McGraw-Hill, India.

Course:- M.Tech

Subject:- Machining Technology Lab

Max. Marks: a) **Internal/Practical-** 25

b) **External-** 25

Year/Semester:- I/I

Subject Code:- MME-111

Credit Hours		
L	T	P
0	0	4

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

1. Demonstrate basic knowledge in mathematics, science and engineering.
2. Design, manufacture and analyze a Mechanical system using modern engineering software tools and measurement systems.
3. Cognize concepts involved in thermal and fluid energy systems.
4. Utilize self education to develop lifelong learning to appraise and adapt global and societal contexts to propose Engineering solutions.

Syllabus Content:

1. Performing step turning, taper turning, thread cutting and knurling on lathe
2. Gear cutting in milling machine
3. Working with shaper, planer and slotting machine
4. Working with surface and cylindrical grinding
5. Determination of cutting force using lathe tool and drill tool dynamometers
6. Study of non-conventional machining processes

Course:- M.Tech

Subject:- ENGLISH FOR RESEARCH PAPER WRITING

Max. Marks: a) Internal/Practical- 30

b) External- 70

Year/Semester:- I/I

Subject Code:- AUD-101

Credit Hours		
L	T	P
2	0	0

Course objectives:

Students will be able to:

1. Understand that how to improve your writing skills and level of readability
2. Learn about what to write in each section

Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission

Syllabus Contents:

Unit 1: Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

Unit 2: Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction

Unit 3: Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

Unit 4: key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature,

Unit 5: skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions

Unit 6: useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

Suggested Studies:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book .
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011