

SHRI VENKATESHWARA UNIVERSITY



Syllabus

M.TECH
Production Engineering
Ist SEMESTER
(Two Years Post Graduation Programme)

(w.e.f. 2019-20)

**SCHOOL OF ENGINEERING &
TECHNOLOGY**

Production Engineering SEMESTER-I

Sl. No	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	MPR-101	Advances In Forming And Joining Processes	3	0	0	20	10	30		70		100	3
2	MPR-102	Theory Of Machining And Grinding	3	0	0	20	10	30		70		100	3
3	WPR-012	Advanced Engineering Mathematics	3	0	0	20	10	30		70		100	3
4	MPR-022	Materials Management	3	0	0	20	10	30		70		100	3
5	MPR-111	Manufacturing Process Lab	0	0	4				25		25	50	2
6	MPR-112	Computational Lab	0	0	4				25		25	50	2
7	MLC-101	Research Methodology and IPR	2	0	0	20	10	30		70		100	2
8	AUD-101	English for Research Paper Writing	2	0	0								0
		Total										600	18

Course:- M.Tech

Subject:- Advances In Forming And Joining Processes

Max. Marks: a) Internal/Practical- 30

b) External- 70

Year/Semester:- I/I

Subject Code:- MPR-101

Credit Hours		
L	T	P
3	0	0

Syllabus Contents:

UNIT-I

Review of Theory of Elasticity: Stress and Strain tensor, stress and strain transformation, differential equation of equilibrium, Mohr's circles (three dimensional stress situation), Plane stress and Plane strain.

UNIT-II

Review of theory of Plasticity: Stress space, Yield criterion, Von-Mises, Tresca's yield criterion, Yield Surface, Slip Line Field theory, Stress-Strain relationships - treatment involving differential equation, Upper and Lower bound theorem.

UNIT-III

Metal forming processes and analysis: Drawing and extrusion, rolling, forging, bending, High Energy density metal forming Processes, Powder metallurgical processes.

Advanced Casting Processes: Evaporation casting process, vacuum sealed process, shell mould casting, Rapid Prototyping and Tooling.

UNIT-IV

Review of Basic welding process and classification, power sources, arc and electrode characteristics, electrode selection, Critical and Precision welding processes like: PAW, LBW, EBW, USW etc.

UNIT-V

Welding of Ceramics, Plastics, Composites, Welding Metallurgy, HAZ, Weldability of Plain Carbon Steels, Stainless Steel, Cast Iron, Aluminium and its alloys, Residual stresses and distortion, testing of welding joints.

References:

1. "Introduction to the Theory of Theoretical and Experimental Analysis of Stress and Strain" - Durelli, Phillip's and Tsao, McGraw Hill Book Co.
2. "Theory of Elasticity" - Timoshenko and Goodier, McGraw Hill Book Co.
3. "Engineering Plasticity" - Johnson and Mellur, Van Nostrand-Reinhold Co.
4. "Introduction to the Theory of Plasticity - Metal Forming Applications" - O. Hoffman and G. Sachs, McGraw Hill Book Co.
5. "Introduction to Theory of Plasticity" - Mendelson.
6. "Principles of Metal Casting" - Heine, Loper and Rosenthal, TMH Publication
7. "Principles of Foundry Technology" - P.L. Jail, TMH Publications
8. "Welding for Engineers" - Udin, Funk and Wulf, John Wiley and Sons.
9. "Welding Process and Procedures" - J.L. Morris.
10. "A Text Book of Welding Technology" - O.P. Khanna, Dhanpat Rai & Sons
11. "Modern Arc Welding Technology" - S.V. Nadkarni, Oxford & IBH Publishing Co. Pvt. Ltd./ Advani-Oerlikon Ltd.
12. "Processes and Design for Manufacturing" - S.D.EI Wakil, PWS Publishing.

Date of Revision: July 2018

Course:- M.Tech
Subject:- Theory Of Machining And Grinding
Max. Marks: a) Internal/Practical- 30
b) External- 70

Year/Semester:- I/I
Subject Code:- MPR-102

Credit Hours		
L	T	P
3	0	0

Syllabus Contents:

UNIT-I

Machining, definition and objectives. Geometry of cutting tools; turning, milling and drilling – in different reference systems like machine reference system, tool reference system and work reference system. Sharpening and re-sharpening of cutting tools.

UNIT-II

Mechanism of chip formation by single point tools, drills and milling cutters. Types of chips and their characteristics. Effective rake. Mechanics of machining, theoretical estimation and experimental determination of cutting forces and power consumption. Dynamometers; types, design, construction and use.

UNIT-III

Thermodynamics of machining, sources of heat generation, cutting temperature modeling, measurement of cutting temperature. Cutting fluids; purpose, essential characteristics, selection and methods of application. Cutting tools; methods of failure, mechanics of tool wear, essential properties, assessment of tool life and cutting tool materials.

UNIT-IV

Economics of machining; principal objectives, main parameters and their role on cutting forces, cutting temperature, tool life and surface quality, selection of optimum combination of parameters.

UNIT-V

Causes of vibration and chatter in machining, and their remedy. Mechanics of grinding, characteristics, specification and selection of grinding wheels. Process and wheel parameters in grinding. Grinding forces, grinding fluid applications, grinding ratios and surface integrity. High speed grinding and modern grinding wheels.

References:

1. "Metal Cutting : Theory and Practice" - A. Bhattacharyya , Central Book Publishers, Kolkata
2. "Metal Cutting Principles" - M.C. Shaw, Oxford University Press CBS
3. "Fundamentals of Metal Machining & Machine Tools" - G. Boothroyd, McGraw Hill
4. "Introduction to Machining Science" - G.K. Lal ,New Age International Pub., New Delhi
5. "Machining and Machine Tools" - A.B. Chattopadhyay, Wiley India, New Delhi
6. "Metal Cutting Theory and Cutting Tool Design" - V. Arshinov and G. Alekseev Mir Publishers, Moscow
7. "Manufacturing Science" - A. Ghosh and A.K. Mallik, Affiliated East-West Press Pvt. Ltd., New Delhi
8. "Metal Cutting" - E.M. Trent and P.K. Wright, Butterworth Heinemann Publication
9. "Metal Cutting Mechanics" - N.N. Zorev, Pergamon Press.
10. "Grindings Technology: Theory and Application of Machining with abrasives" – S. Malkin, Ellis Harwood Publication, U.K.
10. "Micromachines" - I. Fujimasa, Oxford University Press.

Course:- M.Tech

Subject:- Advanced Engineering Mathematics

Max. Marks: a) Internal/Practical- 30

b) External- 70

Year/Semester:- I/I

Subject Code:- MPR-012

Credit Hours		
L	T	P
3	0	0

Syllabus Contents:

UNIT-I

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 analysis of variance (ANOVA).

UNIT-II

Matrix Operation: Matrix operations; Eigen value and Eigen vector by iterative methods; Diagonalisation of a square matrix.

UNIT-III

Laplace Transform, Fourier Transform; Fourier Integral and their applications.

UNIT-IV

Numerical methods: Interpolation by polynomials; Error analysis; Solution of system of linear equation by Gauss-Seidel iterative method; Newton-Raphson method; Numerical integration by

UNIT-V

Gauss-quadrature; solution of ordinary differential equation by Rayleigh-Ritz method.

References:

1. "Introductory Methods of Numerical Analysis" - S.S. Sastry, PHI
2. "Numerical Methods for Scientific and Engineering Computation" - M.K. Jain, S.R.K. Iyengar, R.K. Jain, New Age International Pub.
3. "An Outline of Statistical Theory" Volume I, II -A.M. Goon, M.K. Gupta, B. Dasgupta, The World Press Private Ltd.
4. "The Design of Experiments to find Optimal Conditions" - Yu.P. Adler, E.V. Markova, Ylu.V. Granovsky, MIR publication, Moscow
5. "Advanced Engineering Mathematics"- E. Kreyszig, John Wiley & Sons.
6. "Advanced Engineering Mathematics"- S. Grossman and W.R. Derrick, Harper & Row Publishers.
7. "Experimental Designs" - W.C. Cochran and G.M. Cox, John Wiley & Sons, New York.
8. "Design and Analysis of Experiments"- D.C. Montgomery, Wiley-India Edition.

Course:- M.Tech

Subject:- Materials Management

Max. Marks: a) Internal/Practical- 30

b) External- 70

Year/Semester:- I/I
Subject Code:- MPR-022

Credit Hours		
L	T	P
3	0	0

Syllabus Contents:

UNIT-I

Integrated material management; The material cycle, forecasting material need, procurement and storage; Vendor rating, incoming material inspection and acceptance sampling, Classification of Inventory; ABC, VED, and FSN analysis.

UNIT-II

Standardization, codification and variety reduction, control of level of inventory and frequency of purchase, Assessment of risk of inventory through Beta analysis in uncertain conditions of demand, Kanban inventory, TOC, SCM, MRP and JIT.

UNIT-III

Optimal Control theory in materials management.

UNIT-IV

Material management and Legal Environment; Value Analysis, Price Negotiation Strategies, Information System for Effective materials management, Application of Soft Computing in materials management.

Reference Books:

1. "Manufacturing Planning and Control Systems" - Vollmann, Bery and Whybarn, Tata- McGraw Hill Publication, New Delhi.
2. "Integrated Materials Management" - Plossel.
3. "Integrated Materials Management" - Tersine.

Course:- M.Tech
Subject:- Manufacturing Process Lab
Max. Marks: a) Internal/Practical- 25
b) External- 25

Year/Semester:- I/I
Subject Code:- MPR-111

Credit Hours		
L	T	P
0	0	4

Syllabus Content:

- 1) Testing of moulding sand, and Casting of non-ferrous metals / alloys,
- 2) Heat Treatment, and Metallographic studies,
- 3) Characterisation and Testing of Fabrication processes: GMAW, GTAW, etc.,
- 4) Surface Grinding operation and its parametric dependence,
- 5) Grinding of Cutting Tools with a given tool signature,
- 6) Chip formation in machining processes under different process parameters,
- 7) Metal forming, etc.

Course:- M.Tech
Subject:- Computational Lab
Max. Marks: a) Internal/Practical- 25
b) External- 25

Year/Semester:- I/I
Subject Code:- MPR-112

Credit Hours		
L	T	P
0	0	4

Syllabus Content:

- 1) Component drafting and drawing through AutoCAD or similar software
- 2) Stress analysis using standard software such as ANSYS, etc.
- 3) Use of CAD/CAM software like Solid Edge, ProEngineer, etc. for component manufacture
- 4) Use of a Project Engineering Software, etc.

Course:- M.Tech
Subject:- Research Methodology and IPR
Max. Marks: a) Internal/Practical- 30
b) External- 70

Year/Semester:- I/I
Subject Code:- MLC-101

Credit Hours		
L	T	P
2	0	0

Course Outcomes:

At the end of this course, students will be able to

- Understand research problem formulation.
- Analyze research related information
- Follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, buttomorrow world will be ruled by ideas, concept, and creativity.
- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

Syllabus Contents:

Unit 1: Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit 2: Effective literature studies approaches, analysis Plagiarism, Research ethics,

Unit 3: Effective technical writing, how to write report, Paper

Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit 4: Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Unit 5: Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

Unit 6: New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

References:

- Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students"
- Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
- Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners"

- Halbert, “Resisting Intellectual Property”, Taylor & Francis Ltd ,2007.
- Mayall , “Industrial Design”, McGraw Hill, 1992.
- Niebel , “Product Design”, McGraw Hill, 1974.
- Asimov , “Introduction to Design”, Prentice Hall, 1962.
- Robert P. Merges, Peter S. Menell, Mark A. Lemley, “ Intellectual Property in New Technological Age”, 2016.
- T. Ramappa, “Intellectual Property Rights Under WTO”, S. Chand, 2008

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