UNIT 7: Gyroscope: Vectorial representation of angular motion. Gyroscopic couple. Effect of gyroscopic couple on ship, plane disc, aeroplane, stability of two wheelers and four wheelers.

06 Hours

UNIT 8: Analysis of Cams: Analysis of Tangent cam with roller follower and Circular arc cam operating flat faced and roller followers. Undercutting in Cams

06 Hours

TEXT BOOKS:

1. **Theory of Machines**, Sadhu Singh, Pearson Education. 2nd edition. 2007.
2. **Theory of Machines**, Rattan S.S. Tata McGraw Hill Publishing Company Ltd., New Delhi, 3rd Edition, 2009.

REFERENCE BOOKS:

1. **"Theory of Machines & Mechanisms"**, J.J. Uicker, , G.R. Pennock, J.E. Shigley. OXFORD 3rd Ed. 2009
2. **Mechanism and Machine Theory**, A.G.Ambekar PHI, 2007

MANUFACTURING PROCESS – III

(METAL FORMING PROCESS)

Sub Code	: 10ME 55	IA Marks	: 25
Hrs/week	: 04	Exam Hours	: 03
Total Lecture Hrs	: 52	Exam Marks	: 100

PART - A

UNIT - 1

Introduction And Concepts: Classification of metal working processes, characteristics of wrought products, advantages and limitations of metal working processes.Concepts of true stress, true strain, triaxial & biaxial stresses. Determination of flow stress. Principal stresses, Tresca & Von-Mises yield criteria, concepts of plane stress & plane strain.

07 Hours

UNIT - 2

Effects Of Parameters: Temperature, strain rate, friction and lubrication, hydrostatic pressure in metalworking, Deformation zone geometry, workability of materials, Residual stresses in wrought products.

06 Hours

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UNIT - 3

Forging: Classification of forging processes. Forging machines & equipment. Expressions for forging pressures & load in open die forging and closed die forging by slab analysis, concepts of friction hill and factors affecting it. Die-design parameters. Material flow lines in forging. Forging defects, Residual stresses in forging. Simple problems.

07 Hours

UNIT - 4

Rolling: Classification of Rolling processes. Types of rolling mills, expression for Rolling load. Roll separating force. Frictional losses in bearing, power required in rolling, Effects of front & back tensions, friction, friction hill. Maximum possible reduction. Defects in rolled products. Rolling variables, simple problems.

06 Hours

PART - B

UNIT - 5

Drawing: Drawing equipment & dies, expression for drawing load by slab analysis, power requirement. Redundant work and its estimation, optimal cone angle & dead zone formation, drawing variables, Tube drawing, classification of tube drawing, simple problems.

07 Hours

UNIT - 6

Extrusion: Types of extrusion processes, extrusion equipment & dies, deformation, lubrication & defects in extrusion. Extrusion dies, Extrusion of seamless tubes. Extrusion variables, simple problem

06 Hours

UNIT - 7

Sheet & Metal Forming: Forming methods, dies & punches, progressive die, compound die, combination die. Rubber forming. Open back inclinable press (OBI press), piercing, blanking, bending, deep drawing, LDR in drawing, Forming limit criterion, defects of drawn products, stretch forming. Roll bending & contouring, Simple problems

06 Hours

UNIT - 8

High Energy Rate Forming Methods: Principles, advantages and applications, explosive forming, electro hydraulic forming, Electromagnetic forming.

Powder Metallurgy: Basic steps in Powder metallurgy brief description of methods of production of metal powders, conditioning and blending powders, compaction and sintering application of powder metallurgy components, advantages and limitations.

07 Hours

TEXT BOOKS:

H.O.D.
Dept. Of Mechanical Engineering
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

1. **Mechanical metallurgy (SI units),** G.E. Dieter, Mc Graw Hill pub.2001

2. **Manufacturing Process – III,** Dr. K.Radhakrishna, Sapna Book House, 2009.

REFERENCE BOOKS:

1. **Materials and Processes in Manufacturing,** E.paul, Degramo, J.T. Black, Ronald, A.K. Prentice -hall of India 2002

2. **Principles of Industrial metal working process,** G.W. Rowe, CBSpub. 2002

3. **Manufacturing Science,** Amitabha Ghosh & A.K. Malik - East - Westpress 2001

4. **Technology of Metal Forming Process,** Surendra kumar, PHI – 2008

TURBO MACHINES

Sub Code	: 10ME 56	**IA Marks**	: 25
Hrs/week	: 04	**Exam Hours**	: 03
Total Lecture Hrs	: 52	**Exam Marks**	: 100

PART- A

UNIT -1

Introduction: Definition of turbomachine, parts of turbomachines, Comparison with positive displacement machines, Classification, Dimensionless parameters and their significance, Effect of Reynold's number, Unit and specific quantities, model studies. Application of first and second law's of thermodynamics to turbomachines, Efficiencies of turbomachines. Problems.

07 Hours

UNIT – 2

Thermodynamics of fluid flow: Static and Stagnation states-Incompressible fluids and perfect gases, Overall isentropic efficiency, stage efficiency (their comparison) and polytropic efficiency for both compression and expansion processes. Reheat factor for expansion process.

07 Hours

UNIT – 3

Energy exchange in Turbomachines: Euler's turbine equation, Alternate form of Euler's turbine equation, Velocity triangles for different values of degree of reaction, Components of energy transfer, Degree of Reaction,