PR8551 DESIGN OF MACHINE ELEMENTS AND TRANSMISSION SYSTEMS

DETAILED SYLLABUS

OBJECTIVE:

To introduce students to the design and theory of common machine elements and to give students experience in solving design problems involving machine elements.

UNIT I INTRODUCTION

Fundamentals of Machine Design-Engineering Design, Phases of Design, Design Consideration - Standards and Codes - Selection of Materials –Design against Static and Dynamic Load –Modes of Failure, Factor of Safety, Principal Stresses, Theories of Failure-Stress Concentration, Stress Concentration Factors, Variable Stress, Fatigue Failure, Endurance Limit, Design for Finite and Infinite Life, Soderberg and Goodman Criteria.

UNIT II DETACHABLE AND PERMANENT JOINTS

Design of Bolts under Static Load, Design of Bolt with Tightening/Initial Stress, Design of Bolts subjected to Fatigue – Keys -Types, Selection of Square and Flat Keys-Design of Riveted Joints and Welded Joints

UNIT III SHAFTS AND COUPLING

Design of Shaft –For Static and Varying Loads, For Strength and Rigidity-Design of Coupling-Types, Flange, Muff and Flexible Rubber Bushed Coupling

UNIT IV GEARS AND BELT DRIVES

Design of Spur and Helical Gear drives-Design of Belt drives-Flat and V Belts

UNIT V SPRINGS AND BEARINGS

Design of Helical Spring-Types, Materials, Static and Variable Loads-Design of Leaf Spring-Design of Journal Bearing -Antifriction Bearing-Types, Life of Bearing, Reliability Consideration, Selection of Ball and Roller Bearings

TEXT BOOKS:

1. Joseph Edward Shigley, Charles R. Mischke " Mechanical Engineering Design", McGraw Hill, International Edition, 1992

2. Sharma. C.S. and Kamlesh Purohit, " Design of Machine Elements", Prentice Hall of India Private Limited, 2003

REFERENCES:

1. Bhandari. V.B., "Design of Machine Elements", Tata McGraw-Hill Publishing Company Limited, 2003.

2. Robert L.Norton, "Machin Design – An Integrated Approach", Prentice Hall International Edition, 2000.