SHRI VENKATESHWARA UNIVERSITY

Syllabus

M.TECH - PART TIME
Production Engineering
Vth SEMESTER
(Three Years Post Graduation Programme)

(w.e.f. 2019-20)

SCHOOL OF ENGINEERING & TECHNOLOGY

Production Engineering

SEMESTER-V

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total	Credit
			L	T	P	CT	TA	Total	PS	TE	PE		
1	WPR-053	Robotics And Robot Applications	3	0	0	20	10	30		70		100	3
2	WOE-555	Composite Materials	3	0	0	20	10	30		70		100	3
3	WPR-521	Dissertation Phase – I	0	0	20				125		125	250	10
		Total										450	16

Course:- M.Tech   **Year/Semester:-** III/V
Subject:- Robotics And Robot Applications   **Subject Code:-** WPR-053
Max. Marks: a) Internal/Practical- 30
                b) External- 70

Credit Hours		
L	T	P
3	0	0

Syllabus Contents:

UNIT-I
Robot definition: Robotic systems - Its role in automated manufacturing; robot anatomy; robot classifications and specifications.

UNIT-II
Robot kinematics, forward and reverse transformations, homogeneous transformation.
Robot Dynamics: Introduction to Force Analysis, Trajectory generation.

UNIT-III
Robot actuators and control; Pneumatic, hydraulic and electrical drives and controls used in robots. Robot end-effectors- mechanical, magnetic and vacuum grippers, gripping forces, RCC and design features of grippers. Robot sensors- contact and non-contact sensors, Robot vision and their interfaces.

UNIT-IV
Robot languages and programming techniques.
Applications of robots in materials handling, machine loading/unloading, inspection, welding, spray painting and finish coating, and assembly, etc.

UNIT-V
Economic performance and evaluation strategies, Robot installation and planning. Safety features.

References:
1. "Introduction to Robotics"- J.J. Craig, Addison-Wesley.
2. "Fundamentals of Robotics Analysis and Control"- R.J. Schilling, Prentice Hall of India.
3. "Robotics Technology and Flexible Automation"- S.R. Deb, Tata McGraw-Hill Publication.
4. "Foundations of Robotics Analysis and Control"- T. Yoshikawa, Prentice Hall of India.
5. "Robotics for Engineers"- Y. Koren, McGraw-Hill Book Company, New York.
6. "Industrial Robots and Computer Integrated Manufacturing"- S. Kumar, Oxford & IBH Publishing Co. Ltd.
7. "Automation, Production Systems, and Computer-Integrated Manufacturing" - M.P. Groover, Prentice Hall of India.
8. "Computer Aided Manufacturing"- P.N. Rao, N.K. Tewari and T.K. Kundra, Tata McGraw-Hill Publication.
9. "Robotics: Control, Sensing, Vision and.lntelligence"- K.S. Fu, R.C. Gonzales and C.S.G. Lee, McGraw Hill, 1997
10. "Analytical Robotics and Mechatronics", W. Stadler, McGraw Hill Book Co.

UNIT–I: INTRODUCTION: Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix. Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

UNIT – II: REINFORCEMENTS: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.

UNIT – III: Manufacturing of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT–IV: Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.

UNIT – V: Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

TEXT BOOKS:
1. Material Science and Technology – Vol 13 – Composites by R.W.Cahn – VCH, West Germany.
2. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R. Balasubramaniam, John Wiley & Sons, NY, Indian edition, 2007.

References:
1. Hand Book of Composite Materials-ed-Lubin.
2. Composite Materials – K.K.Chawla.
3. Composite Materials Science and Applications – Deborah D.L. Chung.
4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W. Tasi.

Course:- M.Tech   **Year/Semester:-** III/V
Subject:- Dissertation I   **Subject Code:-** WPR-521
Max. Marks: a) Internal/Practical- 125
                 b) External- 125

Credit Hours		
L	T	P
0	0	20

Course Outcomes: At the end of the course, the student will be able to:
• Identify structural engineering problems reviewing available literature.
• Identify appropriate techniques to analyze complex structural systems.
• Apply engineering and management principles through efficient handling of project

Syllabus Contents:

Dissertation-I 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 and must bring out individuals contribution.

Continuous assessment of Dissertation – I and Dissertation – II at Mid Sem and End Sem will bemonitored by the departmental committee.