

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. SEMESTER : VI

MANUFACTURING ENGINEERING

Subject Name: MECHATRONICS

Subject Code:163405

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam(E)	Mid Sem Exam(Theory) (M)	Practical (Internal)
3	0	2	5	70	30	50

Sr No	Course Contents
1	Mechatronics, Sensors and Transducers Introduction to mechatronics systems – Measurement systems – Control systems – Microprocessor based controllers. Sensors and transducers – Performance terminology – Sensors for displacement, position and proximity: Velocity, motion, force, fluid pressure, liquid flow, liquid level, temperature, light sensors – Selection of sensors.
2	Actuation Systems Mechanical actuation systems – Cams – Gear trains – Ratchet and pawl – Belt and chain drives – Bearings – Electrical actuation systems – Mechanical switches – Solid state switches – Solenoids – D.C Motors – A.C Motors – Stepper motors.
3	System Models And Controllers Building blocks of mechanical, electrical, fluid and thermal systems – Rotational, transnational, electromechanical, hydraulic and mechanical systems – Continuous and discrete process controllers – Control mode – Two – Step mode – Proportional mode – Derivative mode – Integral mode – PID controllers – Digital controllers – Velocity control – Adaptive control – Digital logic control – Micro processors control.
4	Programming Logic Controllers Programmable logic controllers – Basic structure – Input / Output processing – Programming – Mnemonics – Timers, internal relays and counters – Shift registers – Master and jump controls – Data handling – Analogs Input / Output – Selection of a PLC problem.
5	Design of Mechatronics System Stages in designing mechatronics systems – Traditional and mechatronic design – Possible design solutions – Case studies of mechatronics systems – Pick and place robot – Automatic car park systems – Engine management systems..

TEXT BOOK

1. Bolton W., “Mechatronics”, 2nd Edition, Pearson Education, 1999.

REFERENCES

1. Michael B. Histan and Alciatore, D.G., "Introduction to Mechatronics and Measurement Systems", McGraw-Hill International Editions, 2000.
2. Bradley D. A., Dawson D., Buru N.C. and. Loader A.J, "Mechatronics", Chapman and Hall, 1993.
3. Dan Neculescu, "Mechatronics", Pearson Education Asia, 2002.
4. Kamm, L. J., "Understanding Electro – Mechanical Engineering", An Introduction to Mechatronics, Prentice – Hall of India Pvt., Ltd., 2000.
5. Nitaigour Premchand Mahadik, "Mechatronics", Tata McGraw-Hill publishing Company Ltd, 2003.