

SARDAR PATEL UNIVERSITY
Programme & Subject: P. G. Diploma in Defence Materials
Semester: II
Syllabus with effect from: December - 2015

Paper Code: PT02CDMC01	Total Credit: 4
Title Of Paper: Sensors and Devices	

Unit	Description in Detail	Weightage (%)
I	Importance of sensors in defense, Classification of sensors, Measurement standards; Gas sensors-classification, Indirect and Direct Techniques, electrochemical sensors, catalytic gas sensors, semiconductor gas sensors, ceramic, thick and thin film sensors, array of gas sensors, electronic nose Fiber optic sensors (FOSs), Basic concepts, Architecture of Fiber Optic Sensors, Applications-Temperature, Humidity, Liquid level, Fluid flow and Microbend sensors, Fiber Optic Chemical Sensors, Distributed Sensing System using OTDR, Integrated Optics Sensors, Seismic Sensors	25%
II	Resonating quartz sensors, Surface Acoustic Wave Sensors (SAW), SAW sensors operation – Chemical and Physical Sensors, Magnetic field sensors, Mechanical Sensors; Bio Sensors, Classification of Biosensors, Enzyme based biosensors, Electrodes for Electrochemical Biosensors, Optical Biosensors, SAW biosensors; Silicon Micromachining, Micro Electro Mechanical Sensors (MEMS), Si sensors and ASIC designing; Smart sensors, Bus Operated Sensing System, Intelligent sensing system	25%
III	Introduction to wireless communication and Standards, Global Positioning Sensors (GPS), A brief history of navigation and positioning, Introduction to Early techniques in Positioning, Satellite based Navigation System, Non GNSS Positioning System, GNSS Positioning System, Military Applications of GIS, Integration of GPS with Remote Sensing and GIS; Wireless Sensor Networks (WSN) – Introduction and Overview, Applications of WSN, Examples of category 1 WSN Applications, Basic Wireless Sensor Technology	25%
IV	Field- effect devices and their structures with working mechanisms, Submicron MOSFET, Multistage amplifiers: Analysis of multistage amplifiers, High frequency response of a CE stage, Analysis of difference amplifiers. Feedback amplifiers: Analysis and design of negative feedback amplifiers. Oscillators: Design and analysis of RC phase shift oscillator, Wein bridge oscillators, Hartley, Colpitts and Crystal oscillators. Power amplifiers, Design of heat sink, power output and cross over distortion. Tuned amplifier: Single tuned and double tuned interstage design. Class B and class C tuned power amplifiers.	25%

Basic Text & Reference Books:-

- Sensors for Domestic Applications, Alnado D'Amico and Giorgio Sbeveghen, World Scientific Co. (USA)
- Sensors and Transducers (Second Edition), D. Patranabis, Prentice Hall India Pvt. Ltd, New Delhi
- Electronic Devices and Circuit- An Introduction, Allen Mottershead, PHI publication
- Electronic Devices and Circuit Theory, Robert L. Boylestad, Louis Nashelsky, PEARSON
- Advance in Biosensors, A. P. F. Turner, Jai Press Ltd., New Delhi
- Optical Fiber communication, Gerd Kaiser , 4th Edition, TataMcGraw Hill, 2008.



- Fiber optics in Telecommunications and sensor systems, S K Sarkar, S Chand & Co., New Delhi, 2002.
- Optical Fiber Sensors, J P Dakin and B Culshaw , Vol. 1 & 2, Artech House, Boston and London, 1998.
- Biosensors Principles & Applications, Loic J. Blum and Pierre R. Coulet, Marcel Dekker Inc (USA)
- Millman and Halkias, Integrated Electronics, 2nd Edition, Tata Mcgraw Hill Education Private Limited, 2010.
- Solid State Electronic Devices, Ben G.Streetman, 6th Edition, Prentice-Hall of India
- Analysis and Design of Analog Integrated Circuits, Paul Gray and Meyer, 5th Edition, Wiley India, 2010.
- Integrated Electronics, J. Millman and Halkias, 2nd Edition, TMH, 2010.
- Micro Electronics, J. Millman and A.Grabel, 2nd Edition, TMH, 2009.
- Global Positioning, Technologies and Performance, Nel Samama, Wiley Interscience, A John Willey and Sons Inc., Publication, 2008, ISBN 978-0-471-79376-2
- Global Positioning System: Signals, Measurements, and Performance (Revised Second Edition), Pratap Misra, Per Enge, 2010
- Introduction to GPS: the Global Positioning System, Ahmed El-Rabbany Artech House, Incorporated, 2006, ISBN 1-58053 – 183-1
- Integration of GPS with Remote Sensing and GIS: Reality and Prospect, Jay Gao, Photogrammetric Enginbring & Remote Sensing, May 2002
- Wireless Sensor Networks, Technology, Protocols and Applications, Kazem Sohraby, Daniel Minoli, Taieb Znati, Wiley Interscience, A John Willey and Sons Inc., Publication, 2007, ISBN 978-0-471-74300-2

