GONDWANA UNIVERSITY, GADCHIROLI

SYLLABUS (SEMESTER PATTERN CHOICE BASED CREDIT SYSTEM)

M.Tech. (Computer Science & Engineering)

Semester-III

Course Code: **PCSS31A**
Title of the Course: **Wireless Sensor Networks**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents

Overview of wireless sensor networks, Challenges for Wireless Sensor Networks design, Enabling Technologies for Wireless Sensor Networks.

Architecture of WS, Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

Networking sensors, Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing.

Infrastructure establishments, topology control, clustering, time Synchronization, localization and Positioning, Sensor Tracking and Control.

Sensor networks platforms and tools, Sensor node hardware – Berkeley Motes, programming challenges, node-level software platforms, Node-level Simulators, State-centric programming.

Reference Books:

1. Holger Karl & Andreas Willig, “Protocols And Architectures for Wireless Sensor Networks”, John Wiley, 2005.
2. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.
3. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks- Technology Protocols, And Applications”, John Wiley, 2007.
4. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.

Course Code: **PCSS31B**
Title of the Course: **VLSI Technology**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents

Environment for VLSI Technology:
Clean room and safety requirements, Wafer cleaning processes and wet chemical etching techniques.

Impurity incorporation:
Solid State diffusion modeling and technology; Ion Implantation modeling, technology and damage annealing; characterization of impurity profiles. Oxidation: Kinetics of Silicon dioxide growth both for thick, thin and ultrathin films, Oxidation technologies in VLSI and ULSI; Characterization of oxide films, High k and low k dielectrics for ULSI.

Lithography:
Photolithography, E-beam lithography and newer lithography techniques for VLSI/ULSI; Mask generation.

Chemical Vapor Deposition techniques:
CVD techniques for deposition of polysilicon, silicon dioxide, silicon nitride and metal films; Epitaxial growth of silicon; modeling and technology. Metal film deposition: Evaporation and sputtering techniques, Failure mechanisms in metal interconnects; Multi-level metallization schemes.

Plasma and Rapid Thermal Processing:
PECVD, Plasma etching and RIE techniques; RTP techniques for annealing, growth and deposition of various films for use in ULSI. Process integration for NMOS, CMOS and Bipolar circuits; Advanced MOS technologies.

Text Books:

1. VLSI Technology: C. Y. Chang and S. M. Sze (Ed), McGraw Hill Companies Inc, (1996).
2. VLSI Fabrication Principles: S. K. Ghandhi, John Wiley Inc., New York, (1983).
3. VLSI Technology 2nd ed.: S. M. Sze (Ed), McGraw Hill, (1988).

Reference Books:

1. Physics of Semiconductor Devices: S. M. Sze, Wiley Eastern, (1981).

Course Code: **PCSS31C**
Title of the Course: **CNC & Robotics**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents

Concepts of NC, CNC, DNC. Classification of CNC machines, Machine configurations, Types of control, CNC Controller characteristics, Interpolators.

Cutting tool materials, carbide inserts classification, qualified; semi qualified and preset tooling, tooling system for Machining centre and Turning centre, work holding devices of CNC Machines.

Programming CNC machines, Part print analysis and Process planning, Advanced Programming features, Canned cycles, Subroutines, Macros, special cycles etc. APT part programming using CAD/CAM, Parametric programming.

Manual part programming for CNC turning, milling and machining center. Wire EDM machines. Computer assisted part programming techniques, Conversational and Graphics based software, and Solids based part programming. Freeform surface machining. Simulation and Verification of CNC programs, Adaptive CNC control techniques. Integration of CNC machines for CIM.

Robotics, Basic concepts, Robot configurations, Basic robot motions, Types of drives, and Applications

Transformations and kinematics, Vector operations, Translational transformations and Rotational transformations, Properties of transformation matrices, Homogeneous transformations and Manipulator, Forward solution, Inverse solution. Controls and end effectors, Control system concepts, Analysis, control of joints, Adaptive and optimal control.

End effectors, Classification, Mechanical, Magnetic Vacuum, Adhesive, Drive systems, Force analysis and Gripper design. Robot programming, Methods, Languages, Computer control and Robot Software– Programming Languages.

Sensory devices, Non optical and optical position sensors, Velocity and Acceleration, Range, Proximity, touch, Slip, Force,Torque. Machine vision, Image components, Representation, Hardware, Picture coding, Object Recognition and categorization. Integration of Robots with CNC machines for CIM.

Reference Books:

1. Krar, S., and Gill, A., "CNC Technology and Programming", McGraw Hill publ Co, 1990.
2. Gibbs, D., "An Introduction to CNC Machining", Casell, 1987.
3. Lynch, M., "Computer Numerical Control for Machining", McGraw Hill, 1992.
4. Koren Y, "Computer Control of Manufacturing Systems", McGraw, 1986.
5. Fu K.S., Gonzalez R.C., and Lee C.S.G.," Robotics control, sensing, vision, and intelligence", McGraw-Hill Book Co., 1987.
6. Klafter R.D., Chmielewski T.A. and Negin M.," Robot Engineering An Intergrated approach", Prentice Hall of India, New Delhi, 1994.
7. Deb S.R., "Robotics Technology and Flexible Automation", Tata McGraw-Hill Publishing Co.,Ltd., 1994.
8. Craig J.J., "Introduction to Robotics Mechanics and Control", Addison-Wesley, 1999.

Course Code: PCSS31D
Title of the Course: Total Quality Systems & Engineering

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	02	--	05	04	03	10	20	70	100

Contents
Principles of Quality Management, Pioneers of TQM, Quality costs, Quality system, Customer Orientation, Benchmarking, Re-engineering. Leadership, Organizational Structure, Team Building, Information Systems and Documentation, Quality Auditing, ISO 9000, QS 9000, Quality Awards. Single Vendor Concept, J.I.T., Quality Function Deployment, Quality Circles, KAIZEN, POKA-YOKE, Taguchi Method. Methods and Philosophy of Statistical Process Control, Control Charts for Variables and Attributes. Cumulative sum and exponentially weighted moving average control charts, Others SPC Techniques, Process Capability Analysis. Acceptance Sampling-Problem, Single Sampling Plans for attributes, double, multiple and sequential sampling. Six-Sigma manufacturing concept.

Reference Books:

1. Mohamed Zairi, "Total Quality Management for Engineers", Woodhead Publishing Limited 1991.
2. HarvidNoori and Russel, "Production and Operations management-Total Quality and Responsiveness", McGraw-Hill Inc, 1995.
3. N.Logothetis, "Managing for Total Quality", Prentice Hall of India Pvt .Ltd,1998
4. John Bank, "The Essence of Total Quality Management", Prentice Hall of India Pvt. Ltd., 1995.
5. Douglus C. Montgomery, "Introduction to Statistical Quality Control", 2nd Edition, John Wiley and Sons, 1991.
6. Grant E.L and Leavensworth, "Statistical Quality Control", McGraw-Hill, 1984.M. Imai, "Kaizen".

Course Code: PCSS32
Title of the Course: Study of Soft Computing and Data Analysis Tools

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
-	08	-	08	05	-	-	100	-	100

Contents
Students are expected to explore various tools available in areas like Soft Computing and Data Analysis. The evaluation should be done on the basis of student's hands on practice on the tools.

Course Code: PCSS33
Title of the Course: Grand Seminar

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
-	06	-	06	04	-	-	100	-	100

Contents
Admitted candidates are required to deliver a seminar on any topic based on all courses of Second Semester of the program. Further that the selected topic will be other than topic/area of study selected for the Dissertation during third and fourth semester.

Course Code: PCSS34
Title of the Course: Pre-Dissertation

Course Scheme					Evaluation Scheme (Theory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	PEE	Total
-	08	-	08	05	150	-	150

Contents
Student is expected to choose the topic of his dissertation. The scope of proposed study must be in the relevant discipline/area. Student is expected to carry out the following. 1. Identification of proposed Topic/Area of Study for the Dissertation 2. Literature Review related to proposed topic 3. Formulation of Scope & Methodology for the proposed study. 4. Formulation of Hypothesis for the selected study. 5. Preliminary Dissertation Student should prepare & submit a Pre-Dissertation report covering the above mentioned tasks. Evaluation will be on the basis of Brief Report on Dissertation Study undertaken on specified date at the end of semester, Seminar & Viva-Voce.

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SYLLABUS (SEMESTER PATTERN CHOICE BASED CREDIT SYSTEM)

M. Tech. (Computer Science & Engineering)

Semester-IV

Course Code: **PCSS41**
Title of the Course: **Final Dissertation**

Course Scheme					Evaluation Scheme (Theory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	PEE	Total
-	24	-	24	18	200	250	450

Contents
Student is expected to carry out further work on the topic of his dissertation selected in Third Semester. For completion of the selected Dissertation study, the given student is to undertake various activities like System Analysis, System Modeling, System Design and Testing. The student has to deliver a pre-submission seminar on the specified schedule before final submission of the study report in the specified format. The student is also expected to write and register at least two research papers on his/her study undertaken in refereed journals and conferences. Evaluation for this component will be on the basis of submitted Report, Seminar & Viva-Voce.