SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF ENGINEERING & TECHNOLOGY

ELECTRONICS ENGINEERING

Syllabus for

M.E. (Electronics Engineering) Semester III and IV
w.e.f. Academic Year 2016-17
Choice Based Credit System Syllabus

SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF ENGINEERING & TECHNOLOGY

STRUCTURE OF M.E. (ELECTRONICS ENGINEERING)
With Effect from Academic Year 2016-17

Four Semester Course

Semester-III

Sr. No.	Subject	Teaching Scheme				Credits			
		L	T	P	Total	*Credits (L)*	*Credits (T)*	*Credits (P)*	*Total Credits*
1	Self Learning Subject	$	-	-	-	3.0	-	-	3.0
2	Lab Practice	-	-	2	2	-	-	1.0	1.0
3	Dissertation Phase I : Synopsis Submission Seminar* (ISE)	-	-	4@	4@	-	-	3.0	3.0
4	Dissertation Phase II : Term Work*(ISE)	-	-	-	-	-	-	3.0	3.0
5	Dissertation Phase II Progress Seminar* (ESE)	-	-	-	-	-	-	6.0	6.0
Total		**-**	**-**	**6**	**6**	**3.0**	**-**	**13.0**	**16.0**

Note –

- $- Being a Self Learning Subject, student shall prepare for examination as per specified syllabus
- *- For all activities related to dissertation Phase I (synopsis submission seminar and progress seminar) student must interact regularly every week with the advisor.
- Synopsis submission seminar shall cover detailed synopsis of the proposed work. Student shall submit synopsis of the dissertation work only after delivering this seminar.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the department before delivering the seminar. A PDF copy of the report must be submitted to the advisor along with other details if any.

Note (Continued)

- Lab Practice shall include any of the below activities related to dissertation work and recommended by advisor. Student shall submit a report after completion of the activity to advisor–
  Software assignments, learning new software, hardware realization, literature survey, filed work, industrial training etc.
- @ Indicates contact hours of students for interaction with advisor.
- Details of modes of assessment of seminar and dissertation shall be as specified in 7(III) of PG Engineering Ordinance of Solapur University, Solapur

- **List Self Learning Subjects -**

Sr.	***Specialization***	***Self Learning Subjects***
1	Telecommunication Engineering	Network and Internet Security
2	VLSI & Embedded	Programmable System on Chip (PSoC)
3	Signal Processing	Advanced Signal and Image Processing
4	Control Systems	Advanced Process Control

Note –

- Student must select Self Learning Subject as per their specialization already selected in Semester I and II
- New Self Learning Subjects may be added as and when required

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STRUCTURE OF M.E. (ELECTRONICS ENGINEERING)
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Four Semester Course

Semester-IV

Sr. No.	Subject	Teaching Scheme				Credits			
		L	**T**	**P**	**Total**	*Credits (L)*	*Credits (T)*	*Credits (P)*	*Total Credits*
1	Dissertation Phase III : Progress Seminar# (ISE)	-	-	6@	6@	-	-	4.0	4.0
2	Dissertation Phase IV: Term Work #(ISE)	-	-	-	-	-	-	6.0	6.0
3	Final Submission of the Dissertation and Viva –Voce (ESE)	-	-	-	-	-	-	6.0	6.0
Total		**-**	**-**	**6**	**6**	**-**	**-**	**16.0**	**16.0**

Note –

- #- For all activities related to dissertation Phase II student must interact regularly every week with the advisor.
- Progress seminar shall be delivered capturing details of the work done by student for dissertation
- Student shall deliver all seminars using modern presentation tools. A hard copy of the report shall be submitted to the department before delivering the seminar. A PDF copy of the report must be submitted to the advisor along with other details if any.
- Student must submit a hard copy of project report to the department
- @ Indicates contact hours of students for interaction with advisor.
- Details of modes of assessment of seminar and dissertation shall be as specified in 7(III) of PG Engineering Ordinance of Solapur University, Solapur

Solapur University, Solapur
M.E. (Electronics)
Self Learning Subject
NETWORK AND INTERNET SECURITY

Examination Scheme
Theory Credits – 3.0

SECTION-I

Unit 1: Introduction:
Overview of ISO's OSI model and TCP/IP model, key management, public-key infrastructure (PKI), remote user authentication using symmetric key encryption, Kerberos, remote user authentication using asymmetric key encryption, federated identity management, biometrics

Unit 2: Wireless network security:
IEEE 802.11 wireless LAN overview: IEEE 802.11 network components, architectural model, IEEE 802.11 services; IEEE 802.11i wireless LAN security: IEEE 802.11i services, IEEE 802.11i phases of operation, discovery phase, authentication phase, key management phase & protected data transfer phase, IEEE 802.11i pseudorandom function

Unit 3: WAP security:
Wireless application protocol (WAP): WAP architecture, wireless application environment, WAP protocol architecture; wireless transport layer security (WTLS): WTLS sessions and connections, WTLS protocol architecture, cryptographic algorithms**,** WAP end-to-end security

SECTION II

Unit 4: Electronic mail security:
Pretty good privacy (PGP): notation, operational description, cryptographic keys and key rings, public-key management, S/MIME: RFC 5322, multipurpose internet mail extensions, S/MIME functionality, S/MIME messages, S/MIME certificate processing, enhanced security services, domain keys identified mail**:** internet mail architecture, e-mail threats, DKIM strategy, DKIM functional flow

Unit 5: Web and IP security:
Web security: web security requirements, secure sockets layer (SSL), transport layer security (TLS), and secure electronic transaction (SET), HTTPS, secure shell (SSH), IP security: IP security overview, architecture, authentication, encapsulating security payload, combining security associations, key management

Unit 6: System security:
Intruders, intrusion detection; password management, malicious software, viruses and related threats, virus countermeasures, distributed denial of service attacks, firewalls: firewall design, principles, trusted systems

- Student must complete at least one assignment based on each unit and submit it to department for assessment.

- **Text Books:**
  1. Cryptography and Network Security: Principles and Practice, 5th Edition, William Stallings, Pearson Education, ISBN: 978-81-317-6166-3
  2. Cryptography and Network Security, Behrouz A. Forouzan, Tata McGraw-Hill. 2007, ISBN: 978-00-706-6046-5

- **Reference Books:**
  1. Network Security And Cryptography, Bernard Menezes, Cengage Learning, 2010, ISBN : 978-81-315-1349
  2. Applied Cryptography, 2nd Edition, Schneier B, Wiley & Sons. 2002, ISBN: 0-471-11709-9

Solapur University, Solapur
M.E. (Electronics)
Self Learning Subject
PROGRMMABLE SYSTEM ON CHIP (PSoC)

Examination Scheme
Theory Credits – 3.0

SECTION-I

Unit 1: Introduction to PSoC:
PSoC technology, programmable routing and interconnect, configurable analog and digital blocks, cpu sub system, families of PSoC (PSoC 1, PSoC 3, PSoC 5), difference between PSoC and conventional MCU.

Unit 2: Introduction to PSoC 3/5:
PSoC 3/5, architecture – block diagram, system wide resources, I/O interfaces, CPU sub system, memory organization, digital sub systems, analog sub systems

Unit 3: PSoC design modules:
Why cypress PSoC, structure of PSoC, PSoC designer suit, limitations of PSoC, improvements of the PSoC, PSoC sub system design, PSoC memory management.

SECTION-II

Unit 4: Mixed-signal embedded design:
Overview of mixed-signal embedded system designs, hardware and software subsystems of mixed-signal architecture, PSoC hardware components, PSoC software components, PSoC interrupt sub system, introduction to PSoC express, system design using PSoC express.

Unit 5: PSoC components:
Universal digital blocks (UDB), UDB arrays and digital system interconnect (DSI), timer, counter and PWM, digital filter blocks (DFB), $\Delta\sum$ ADC topologies and circuits, programmable gain amplifiers, switched capacitor / continuous time, analog routing, flash temperature sensors, DTMF dialers, sleep timers, UART, I2 C, SPI, USB, CAN buses.

Unit 6: System design using PSoC:
Interfacing of temperature sensors and tachometers, SPI and UART based task communications, lower noise continuous time signal processing with PSoC, data acquisition and control system with PSoC, ultra wide-based RADAR, serial bit receiver with hardware Manchester decoder, DTMF detector, ultrasonic vehicle parking assistant, universal wide-range signal generator.

- Student must complete at least one assignment based on each unit and submit it to department for assessment.

- **Text Books:**
  1. PSoC 3, PSoC 5 Architecture technical reference manual, Cypress website
  2. My First Five PSoC 3 design (e-book), Robert Asbhby, Cypress website

- **Reference Books:**
  1. Designer Guide to the Cypress PSoC, Robort Ashby, Elsevier Publications
  2. Introduction to Mixed Signal Embedded Design, Alex Doboli, Springer
  3. The Beginners Guide to Using PSoC Express: Mixed-Signal Microcontroller Development without Code, Oliver H. Bailey, Timelines Industries Incorporated, 2007
  4. PSoC Mikrocontroller by Fredi Kruger Franzis, 2006

- **Web References:**
  1. www.cypress.com/go/psoc
  2. www.cypress.com/go/trainning
  3. www.cypress.com/go/support
  4. www.psocdeveloper.com

Solapur University, Solapur
M.E. (Electronics)
Self Learning Subject
ADVANCED SIGNAL AND IMAGE PROCESSING

Examination Scheme
Theory Credits – 3.0

SECTION-I

Unit 1: Biometric technologies:
Biometric systems, biometric functionalities, biometric system errors, design cycle of biometric systems, application of biometric systems, security and privacy issues, case study: design of iris recognition system

Unit 2: Applications of fuzzy logic:
Fuzzy logic in power plants, fuzzy logic in data mining, fuzzy logic in image processing, fuzzy logic in biomedicine, fuzzy logic in industrial and control applications

Unit 3: Medical image processing:
Biomedical image processing, noise reduction filters for medical images, feature extraction and statistical measurements, medical image restoration, bio-medical image segmentation

SECTION-II

Unit 4: Low power design:
Scaling versus power consumption, power analysis, power reduction techniques, power estimation approaches

Unit 5: Programmable digital signal processors:
Evolution of programmable digital signal processors, important features of dsp processors, dsp processors for mobile and wireless communications, processors for multimedia signal processing.

Unit 6: Optimization techniques:
Scheduling and allocation techniques, Euclidean GCD algorithm, orthonormality of Schur polynomials, fast binary adders and multipliers

- Student must complete at least one assignment based on each unit and submit it to department for assessment.

- **Reference Books:**

1. Introduction to Biometrics, A.K.Jain, Springer Publication
2. Introduction to Fuzzy Logic using MATLAB, S.N. Sivanandam, S. Sumathi, S. N. Deepa, Springer Publication
3. Medical Image Processing Concepts and Applications, Sinha, G.R., Patel, Bhagwati
4. VLSI Digital Signal Processing Systems- Design and Implementation, Keshav K. Parhi, Wiely (India)
5. Architecture for Digital Signal Processing, Peter Pirsch, Wiley India

Solapur University, Solapur
M.E. (Electronics)
Self Learning Subject
ADVANCED PROCESS CONTROL

Examination Scheme
Theory Credits – 3.0

SECTION-I

Unit 1: Process dynamics and mathematical modeling:
Modeling procedure, linearization, numerical solutions of ordinary differential equations, input-output models and transfer functions, dynamic behavior of typical process systems, serial & parallel structures of simple systems, multiple input-multiple output systems

Unit 2: Empirical model identification:
An empirical model building procedure, process reaction curve methods, statistical model identification.

Unit 3: Conventional feedback control system:
Desired features of a PID controller, PID controller tuning for dynamic performance, stability analysis of control systems, controller tuning based on stability: Ziegler – Nichols closed loop method, digital implementation of process control, effects of digital control on stability, tuning and performance, performance of feedback control systems

Unit 4: Cascade & feed forward control:
Cascade control: design criterion, cascade performance, controller algorithm & tuning, implementation issues; feed forward control: design criterion, feed forward performance, controller algorithm and tuning, implementation issues; analyzing a nonlinear process with linear feedback control, different issues in improving nonlinear process performance

SECTION-II

Unit 5: Model based control:
The structure of model based control, modeling approaches, internal model control (IMC), the Smith predictor, model predictive control (MPC), process model based control (PMBC), implementation guidelines.

Unit 6: Nonlinear adaptive control:
Adaptation of feedback parameters, programmed adaptation, switching controller gains and self-tuning controllers: model based methods, model reference adaptive control, pattern recognition controllers.

Unit 7: Multivariable control:
Multi-loop control, effects of interaction, performance analysis, multivariable predictive control and dynamic matrix control (DMC) approach for signal variable and multivariable, implementation issues in DMC.

Unit 8: Statistical process control:
Shewhart chart, interpretation of chart, distinction between automatic process control (APC) & statistical process control (SPC), implementing SPC concepts.

- Student must complete at least one assignment based on each unit and submit it to department for assessment.
- **Reference Books:**

1. Process Control: Designing Processes & Control Systems for Dynamic Performance, Thomas E.Marlin, McGRAW Hill International Edition.
2. Process Control: Instrument Engineers Handbook, Editor, Bela G. Liptak, Butterworth - Heinemann Publishers.
3. Process Dynamics: Modeling, Analysis & Simulation, B. Wayne Bequette, Prentice Hall International Edition.
4. Process Modeling, Simulation and Control for Chemical Engineers, William Luben, McGraw Hill International Edition.
5. Process control systems: Application, Design and Turning, F.G. Sinskey, McGraw Hill Publication
6. Applied Process Control by M. Chidambaram, Allied Publishers Ltd