



VEL TECH MULTI TECH Dr RANGARAJAN Dr.SAKUNTHALA ENGINEERING COLLEGE

(An ISO 9001: 2008 Certified Institution)

(Owned by Vel Trust)

(Approved by Govt. of Tamil Nadu and affiliated to Anna University and
Accredited by NBA, New Delhi)



SYLLABUS

WEEKLY SCHEDULE

III SEMESTER 2015 - 2016

DEPARTMENT OF EEE

II YEAR DEGREE COURSE

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WEEK DETAILS

SL.NO.	WEEK	FROM	TO
1	WEEK1	24.06.2015	26.06.2015
2	WEEK2	29.06.2015	03.07.2015
3	WEEK3	06.07.2015	10.07.2015
4	WEEK4	13.07.2015	17.07.2015
5	WEEK5	20.07.2015	24.07.2015
6	WEEK6	27.07.2015	28.07.2015
7	WEEK7	03.08.2015	07.08.2015
8	WEEK8	10.08.2015	14.08.2015
9	WEEK9	17.08.2015	21.08.2015
10	WEEK10	24.08.2015	28.08.2015
11	WEEK11	31.08.2015	04.09.2015
12	WEEK12	07.09.2015	11.09.2015
13	WEEK13	14.09.2015	18.09.2015
14	WEEK14	21.09.2015	25.09.2015
15	WEEK15	28.09.2015	30.09.2015
16	WEEK16	05.10.2015	09.10.2015
17	WEEK17	12.10.2015	16.10.2015
18	WEEK18	19.10.2015	20.10.2015
19	WEEK19	27.10.2015	30.10.2015

SUBJECT CONTENTS

SL.NO	SUBJECT CODE	SUBJECT NAME
THEORY		
1	ET7008	Advanced Embedded Systems
2	ET7012	Computer in Networking and Digital Control
3	ET7014	Application of MEMS Technology
PRACTICAL		
4	ET7311	Project Work (Phase I)

TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	PRE MODEL EXAM	UNIT TEST IV
1	ET7008	Advanced Embedded Systems	13.07.2015	03.08.2015	21.08.2015	14.09.2015
2	ET7012	Computer in Networking and Digital Control	14.07.2015	04.08.2015	22.08.2015	15.09.2015
3	ET7014	Application of MEMS Technology	15.07.2015	05.08.2015	24.08.2015	16.09.2015

SL.NO	SUBJECT CODE	SUBJECT NAME	MODEL EXAM
1	ET7008	Advanced Embedded Systems	05.10.2015
2	ET7012	Computer in Networking and Digital Control	06.10.2015
3	ET7014	Application of MEMS Technology	07.10.2015

ET7008 ADVANCED EMBEDDED SYSTEMS

WEEK 1:

UNIT I INTRODUCTION TO EMBEDDED HARDWARE AND SOFTWARE

Terminology – Gates – Timing diagram – Memory – Microprocessor buses – Direct memory access – Interrupts

WEEK 2:

Built interrupts – Interrupts basis – Shared data problems – Interrupt latency

WEEK 3:

Embedded system evolution trends – Interrupt routines in an RTOS environment

WEEK 4:

UNIT II SYSTEM MODELLING WITH HARDWARE/SOFTWARE PARTITIONING

Embedded systems, Hardware/Software Co-Design, Co-Design for System Specification and modelling- Single-processor Architectures & Multi-Processor Architectures

WEEK 5:

comparison of Co- Design Approaches, Models of Computation, Requirements for Embedded System Specification, Hardware/Software Partitioning Problem

WEEK 6:

Hardware/Software Cost Estimation, Generation of Partitioning by Graphical modelling, Formulation of the HW/SW scheduling, Optimization

WEEK 7: CYCLE TEST – I:

UNIT III HARDWARE/SOFTWARE CO-SYNTHESIS

The Co-Synthesis Problem

WEEK 8:

State-Transition Graph, Refinement and Controller Generation

WEEK 9:

Distributed System Co-Synthesis.

WEEK 10:

UNIT IV MEMORY AND INTERFACING

Memory: Memory write ability and storage performance – Memory types – composing memory – Advance RAM interfacing communication basic – Microprocessor interfacing I/O addressing

WEEK 11:

Interrupts – Direct memory access – Arbitration multilevel bus architecture – Serial protocol –Parallel protocols – Wireless protocols – Digital camera example

WEEK 12:

**UNIT V CONCURRENT PROCESS MODELS AND
HARDWARE SOFTWARE CO-DESIGN**

Modes of operation – Finite state machines – Models

WEEK 13: CYCLE TEST - II

HCFSL and state charts language – state machine models Concurrent process model – Concurrent process

WEEK 14:

Communication among process –Synchronization among process – Implementation – Data Flow model

WEEK 15 :

Design technology – Automation synthesis – Hardware software co-simulation – IP cores – Design Process Model

WEEK 16: MODEL PRACTICAL EXAM

WEEK 17: MODEL EXAM

WEEK 18: ICD CLASSES

REFERENCES

1. David. E. Simon, “An Embedded Software Primer”, Pearson Education, 2001.
2. Tammy Noergaard, ”Embedded System Architecture, A comprehensive Guide for Engineers and Programmers”, Elsevier, 2006
3. Raj Kamal, “Embedded Systems- Architecture, Programming and Design”Tata McGraw Hill, 2006.
4. Frank Vahid and Tony Gwargie, “Embedded System Design”, John Wiley & sons, 2002.
5. Steve Heath, “Embedded System Design”, Elsevier, Second Edition, 2004.
6. Ralf Niemann, “Hardware/Software Co-Design for Data Flow Dominated Embedded Systems”, Kluwer Academic Pub, 1998.
7. Jorgen Staunstrup, Wayne Wolf, “Harware/Software Co-Design:Principles and Practice”,Kluwer Academic Pub, 1997.
8. Giovanni De Micheli, Rolf Ernst Morgon, “Reading in Hardware/Software Co-Design”Kaufmann Publishers, 2001.

ET7012 COMPUTER IN NETWORKING AND DIGITAL CONTROL

WEEK: 1

UNIT I NETWORK FUNDAMENTALS

Data communication networking – Data transmission concepts –
Communication Networking

WEEK: 2

Overview of OSI- TCP/IP layers – IP addressing - DNS – Packet
Switching –Routing

WEEK: 3

Fundamental concepts in SMTP, POP, FTP, Telnet, HTML, HTTP,
URL, SNMP,ICMP

WEEK 4:

UNIT II DATA COMMUNICATION

Sensor data acquisition, Sampling, Quantization, Filtering ,Data Storage, Analysis using compression techniques, Data encoding –

WEEK 5:

Data link control – Framing, Flow and Error control

WEEK 6:

Point to point protocol, Routers, Switches, Bridges – MODEMs, Network layer – Congestion control , Transport layer- Congestion control, Connection establishment

WEEK 7: CYCLE TEST – I

UNIT III VIRTUAL INSTRUMENTATION

Block diagram and Architecture – Data flow techniques – Graphical programming using GUI

WEEK 8:

Real time system – Embedded controller – Instrument drivers – Software and Hardware

WEEK 9:

Simulation of I/O communication blocks – ADC/DAC – Digital I/O – Counter, Timer, Data communication ports

WEEK 10:

UNIT IV MEASUREMENT AND CONTROL THROUGH INTERNET

Web enabled measurement and control-data acquisition for Monitoring of plant parameters through Internet

WEEK 11:

Calibration of measuring instruments through Internet, Web based control – Tuning of controllers through Internet

WEEK 12:

UNIT V VI BASED MEASUREMENT AND CONTROL

Simulation of signal analysis & controller logic modules for Virtual Instrument control

WEEK 13: CYCLE TEST - II

WEEK14:

Case study of systems using VI for data acquisition

WEEK 15:

Signal analysis, controller design, Drives control

WEEK 16: MODEL PRACTICAL EXAM

WEEK 17: MODEL EXAM

WEEK18 : ICD CLASSES

REFERENCES

1. Wayne Tomasi, "Introduction to Data communications and Networking" Pearson Education, 2007.
1. Al Williams, "Embedded Internet Design", Second Edition, TMH, 2007.
3. Douglas E.Comer, "Internetworking with TCP/IP, Vol. 1", Third Edition, Prentice Hall, 1999.
4. Cory L. Clark, "LabVIEW Digital Signal Processing and Digital Communication", TMH edition 2005.
5. Behrouza A Forouzan,"Data Communications and Networking" Fourth edition, TMH, 2007
6. Krishna Kant,"Computer based Industrial control",PHI,2002.
7. Gary Johnson, "LabVIEW Graphical Programming", Second edition, McGraw Hill, Newyork, 1997.
8. Kevin James, "PC Interfacing and Data Acquisition: Techniques for measurement, Instrumentation and control, Newnes, 2000.
9. Cory L. Clark,"LabVIEW Digital Signal processing and Digital Communications" Tata McGRAW-HILL edition, 2005.

ET7014 APPLICATION OF MEMS TECHNOLOGY

WEEK 1:

UNIT I MEMS: MICRO-FABRICATION, MATERIALS AND ELECTROMECHANICAL CONEPTS

Overview of micro fabrication – Silicon and other material based fabrication processes

WEEK 2:

Concepts: Conductivity of semiconductors-Crystal planes and orientation-stress and strain flexural beam bending analysis

WEEK 3:

torsional deflections-Intrinsic stress- resonant frequency and quality factor..

WEEK 4:

UNIT II ELECTROSTATIC SENSORS AND ACTUATION

Principle, material, design and fabrication of parallel plate capacitors as electrostatic sensors

WEEK 5:

Actuators

WEEK 6:

Applications

WEEK 7: CYCLE TEST – I:

UNIT III THERMAL SENSING AND ACTUATION

Principle, material, design and fabrication of thermal couples,

WEEK 8:

thermal bimorph sensors

WEEK 9:

thermal resistor sensors-Applications

WEEK 10:

UNIT IV PIEZOELECTRIC SENSING AND ACTUATION

Piezoelectric effect-cantilever piezo electric actuator model

WEEK 11:

properties of piezoelectric materials-Applications.

WEEK 12:

UNIT V CASE STUDIES

Piezoresistive sensors, Magnetic actuation,

WEEK 13: CYCLE TEST - II

Micro fluidics applications

WEEK 14:

Medical Applications

WEEK 15 :

Optical MEMS.-NEMS Devices

WEEK 16: MODEL PRACTICAL EXAM

WEEK 17: MODEL EXAM

WEEK 18: ICD CLASSES

REFERENCES

1. Chang Liu, “Foundations of MEMS”, Pearson International Edition, 2006.
2. Marc Madou , “Fundamentals of microfabrication”,CRC Press, 1997.
3. Boston , “Micromachined Transducers Sourcebook”,WCB McGraw Hill, 1998.
4. M.H.Bao “Micromechanical transducers :Pressure sensors, accelerometers and gyroscopes”, Elsevier, Newyork, 2000.
5. P. RaiChoudry“ MEMS and MOEMS Technology and Applications”, PHI, 2012.
6. Stephen D. Senturia, “ Microsystem Design”, Springer International Edition, 2011.
