VELTECH MULTI TECH

Dr RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE

(Owned by Vel Trust 1997)

(An ISO 9001: 2008 Certified Institution)

Accredited By NAAC with 'A' Grade and NBA Accredited Institution

(Approved by AICTE New Delhi and Govt. of Tamil Nadu, Affiliated to Anna University Chennai)

SYLLABUS

WEEKLY SCHEDULE

VII SEMESTER 2017 - 2018

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

IV YEAR DEGREE COURSE

#42, Avadi – Vel Tech Road,
Avadi
Chennai – 600062
Telefax – 044-26841061
E-mail: emailto@veltechmultitech.org
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Vision of the Institute

Elevating Well Being of Humanity by Augmenting Human Resource Potential Through Quality Technical Education and Training

Mission of the Institute

To effectuate supremacy in technical education through articulation of research and industry practices for social relevance. To inculcate the habit of lifelong learning To exhibit professional ethics, commitment and leadership qualities

Vision of the Department

To emerge as a centre of academic eminence in electronics and communication and related spheres through knowledge acquisition and propagation meeting global needs and standards

Mission of the Department

- To impart quality education by inculcating fundamental knowledge in electronics and communication engineering with due focus on research and industry practices.
- To propagate lifelong learning.
- To impart the right proportion of knowledge, attitudes and ethics in students to enable them take up positions of responsibility in the society and make significant contributions.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- PEO1: To prepare students with strong foundation in basic science and mathematics and ability to use these tools in professional career and/or higher education by acquiring knowledge in area of Electronics and Communication Engineering.
- PEO2: Analyze real life problems, design appropriate system to provide solutions that are technically sound, economically feasible and socially acceptable.
- PEO3: To train students with electrical and computer engineering breadth so as to Work on multi-disciplinary projects.
- PEO4: Exhibit professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in lifelong learning.

PROGRAM OUTCOME (POs)

- PO1: Apply knowledge of computing, mathematics, science and engineering fundamentals appropriate to the discipline.
- PO2: Identify, formulate, research literature and solve complex Electronics and Communication Engineering problems for reaching substantial conclusions.
- PO3: Design, implement and evaluate an electronics-based system, process, component or program to the standards for the benefits of the society.
- PO4: Perform investigations of complex problems including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.
- PO5: Use current techniques, skills and modern engineering tools necessary for computing practice.
- PO6: Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.
- PO7: Understand that the solutions have to be provided taking the environmental issues and sustainability into consideration.
- PO8: Understand and commit to professional ethics, responsibilities and norms of engineering practice.
- PO9: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings
- PO10: Communicate effectively on complex Electronics and Communication engineering activities with the engineering community and with society at large, such as being able to comprehend, write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11: An understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects.
- PO12: Realize the need for lifelong learning and engage them to adopt technological changes.

WEEK DETAILS

SL.NO.	WEEK	FROM	TO
1	**WEEK1**	**24.06.2017**	**24.06.2017**
2	**WEEK2**	**27.06.2017**	**01.07.2017**
3	**WEEK3**	**03.07.2017**	**08.07.2017**
4	**WEEK4**	**10.07.2017**	**15.07.2017**
5	**WEEK5**	**17.07.2017**	**22.07.2017**
6	**WEEK6**	**24.07.2017**	**29.07.2017**
7	**WEEK7**	**31.07.2017**	**05.08.2017**
8	**WEEK8**	**07.08.2017**	**12.08.2017**
9	**WEEK9**	**16.08.2017**	**19.08.2017**
10	**WEEK10**	**21.08.2017**	**26.08.2017**
11	**WEEK11**	**28.08.2017**	**01.09.2017**
12	**WEEK12**	**04.09.2017**	**09.09.2017**
13	**WEEK13**	**11.09.2017**	**16.09.2017**
14	**WEEK14**	**18.09.2017**	**23.09.2017**
15	**WEEK15**	**25.09.2017**	**28.09.2017**
16	**WEEK16**	**03.10.2017**	**07.10.2017**
17	**WEEK17**	**09.10.2017**	**14.10.2017**

SUBJECT CONTENTS

SL.NO	SUBJECT CODE	SUBJECT NAME
THEORY		
1	EC6701	RF AND MICROWAVE ENGINEERING
2	EC6702	OPTICAL COMMUNICATION AND NETWORKS
3	EC6703	EMBEDDED AND REAL TIME SYSTEMS
4	IT6005	DIGITAL IMAGE PROCESSING (elective)
5	EC6011	ELECTRO MAGNETIC INTERFERENCE AND COMPATIBILITY (elective)
6	EC6012	CMOS ANALOG IC DESIGN (elective)
PRACTICAL		
7	EC6711	EMBEDDED LABORATORY
8	EC6712	OPTICAL AND MICROWAVE LABORATORY

TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	Pre Model Exam	UNIT TEST IV
1	EC6701	RF AND MICROWAVE ENGINEERING	10.07.2017 FN	27.07.2017 FN	16.08.2017	07.09.2017 FN
2	EC6702	OPTICAL COMMUNICATION AND NETWORKS	10.07.2017 AN	27.07.2017 AN	17.08.2017	07.09.2017 AN
3	EC6703	EMBEDDED AND REAL TIME SYSTEMS	11.07.2017 FN	28.07.2017 FN	18.08.2017	08.09.2017 FN
4	IT6005	DIGITAL IMAGE PROCESSING	11.07.2017 AN	28.07.2017 AN	19.08.2017	08.09.2017 AN
5	EC6011	ELECTRO MAGNETIC INTERFERENCE AND COMPATIBILITY	12.07.2017 FN	29.07.2017 FN	21.08.2017	09.09.2017 FN
6	EC6012	CMOS ANALOG IC DESIGN	12.07.2017 AN	29.07.2017 AN	22.08.2017	09.09.2017 AN

SL.NO	SUBJECT CODE	SUBJECT NAME	MODEL EXAM
1	EC6701	RF AND MICROWAVE ENGINEERING	28.09.17
2	EC6702	OPTICAL COMMUNICATION AND NETWORKS	04.10.17
3	EC6703	EMBEDDED AND REAL TIME SYSTEMS	06.10.17
4	IT6005	DIGITAL IMAGE PROCESSING	09.10.17
5	EC6011	ELECTRO MAGNETIC INTERFERENCE AND COMPATIBILITY	11.10.17
6	EC6012	CMOS ANALOG IC DESIGN	13.10.17

EC6701 RF AND MICROWAVE ENGINEERING

UNIT I TWO PORT NETWORK THEORY

WEEK-1 Review of Low frequency parameters: Impedance, Admittance, Hybrid and ABCD parameters.

WEEK-2 – Different types of interconnection of two port networks, High Frequency parameters, Formulation of S parameters

WEEK-3 - Properties of S parameters, Reciprocal and lossless Network, Transmission matrix, RF behavior of Resistors, Capacitors and Inductors.

WEEK-4- UNIT TEST-I

UNIT II RF AMPLIFIERS AND MATCHING NETWORKS

Characteristics of Amplifiers, Amplifier power relations, Stability considerations, Stabilization Methods, Noise Figure,

WEEK-5 Constant VSWR, Broadband, High power and Multistage Amplifiers, Impedance matching using discrete components, Two component matching Networks, Frequency response and quality factor

WEEK-6 T and Pi Matching Networks, Micro strip Line Matching Networks.

UNIT TEST-II

UNIT III PASSIVE AND ACTIVE MICROWAVE DEVICES

WEEK-7

Terminations, Attenuators, Phase shifters, Directional couplers, Hybrid Junctions, Power dividers, Circulator, Isolator, Impedance matching devices

WEEK-8 - Tuning screw, Stub and quarter wave transformers. Crystal and Schottkey diode detector and mixers, PIN diode switch, Gunn diode oscillator, IMPATT diode oscillator and amplifier, Varactor diode, Introduction to MIC

WEEK-9 & 10 PRE MODEL EXAM

UNIT IV MICROWAVE GENERATION

Review of conventional vacuum Triodes, Tetrodes and Pentodes, High frequency effects in vacuum Tubes

WEEK-11 Theory and application of two cavity Klystron Amplifier

Reflex Klystron oscillator, Traveling wave tube amplifier, Magnetron oscillator using Cylindrical, Linear,

WEEK-12 Coaxial Voltage tunable Magnetrons, Backward wave Crossed field amplifier and oscillator.
UNIT TEST-IV

UNIT V MICROWAVE MEASUREMENTS
WEEK-13 Measuring Instruments: Principle of operation and application of VSWR meter, Power meter, Spectrum analyzer
WEEK-14 Network analyzer, Measurement of Impedance, Frequency, Power, VSWR, Q-factor, Dielectric constant, Scattering coefficients, Attenuation, S-parameters.

WEEK-15, 16 & 17 MODEL EXAM

TEXT BOOKS

1. Reinhold Ludwig and Gene Bogdanov, "RF Circuit Design: Theory and Applications", Pearson Education Inc., 2011
2. Robert E Colin, "Foundations for Microwave Engineering", John Wiley & Sons Inc, 2005
REFERENCE BOOKS

1. David M. Pozar, "Microwave Engineering", Wiley India (P) Ltd, New Delhi, 2008.
2. Thomas H Lee, "Planar Microwave Engineering: A Practical Guide to Theory, Measurements and Circuits", Cambridge University Press, 2004.
3. Mathew M Radmanesh, "RF and Microwave Electronics", Prentice Hall, 2000.
4. Annapurna Das and Sisir K Das, "Microwave Engineering", Tata Mc Graw Hill Publishing Company Ltd, New Delhi, 2005.

EC6702 OPTICAL COMMUNICATION AND NETWORKS

UNIT I INTRODUCTION TO OPTICAL FIBERS

WEEK1 Evolution of fiber optic system- Element of an Optical Fiber Transmission link-- Total internal reflection-Acceptance angle –Numerical aperture

WEEK2 Skew rays Ray Optics-Optical Fiber Modes and Configurations - Mode theory of Circular Wave guides

WEEK3 – Overview of Modes-Key Modal concepts- Linearly Polarized Modes -Single Mode Fibers-Graded Index fiber structure.

WEEK-4 UNIT TEST-I

UNIT II SIGNAL DEGRADATION OPTICAL FIBERS

Attenuation - Absorption losses, scattering losses, Bending Losses, Core and Cladding losses

WEEK-5 Signal Distortion in Optical Wave guides-Information Capacity determination -Group Delay-Material Dispersion, Wave guide Dispersion, Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion,

WEEK-6 Pulse Broadening in GI fibers-Mode Coupling -Design Optimization of SM fibers-RI profile and cut-off wavelength.

UNIT TEST-II

UNIT III FIBER OPTICAL SOURCES AND COUPLING

WEEK-7 - Direct and indirect Band gap materials-LED structures -Light source materials -Quantum efficiency and LED power, Modulation of a LED, lasers Diodes-Modes and Threshold condition -Rate equations - External Quantum efficiency

WEEK-8 Resonant frequencies -Laser Diodes, Temperature effects, Introduction to Quantum laser, Fiber amplifiers- Power Launching and coupling, Lencing schemes, Fiber -to- Fiber joints, Fiber splicing-Signal to Noise ratio , Detector response time.

WEEK 9 & 10 PRE MODEL EXAM

UNIT IV FIBER OPTIC RECEIVER AND MEASUREMENTS

Fundamental receiver operation, Pre amplifiers, Error sources – Receiver Configuration– Probability of Error – Quantum limit.

WEEK-11 Fiber Attenuation measurements- Dispersion measurements – Fiber Refractive index profile measurements

WEEK- 12 Fiber cut- off Wave length Measurements – Fiber Numerical Aperture Measurements – Fiber diameter measurements.

UNIT TEST-IV

UNIT V OPTICAL NETWORKS AND SYSTEM TRANSMISSION

WEEK-13 Basic Networks – SONET / SDH – Broadcast – and –select WDM Networks –Wavelength Routed Networks – Non linear effects on Network performance

WEEK-14 Link Power budget -Rise time budget- Noise Effects on System Performance-Operational Principles of WDM Performance of WDM + EDFA system – Solutions – Optical CDMA – Ultra High Capacity Networks**.**

WEEK-15, 16 & 17 -MODEL EXAMINATION

TEXT BOOKS

1. Gerd Keiser, "Optical Fiber Communication" Mc Graw -Hill International, 4th Edition., 2010.

2. John M. Senior , “Optical Fiber Communication”, Second Edition, Pearson Education, 2007.

REFERENCE BOOKS

1. Ramaswami, Sivarajan and Sasaki “Optical Networks”, Morgan Kaufmann, 2009.

2. J.Senior, "Optical Communication, Principles and Practice", Prentice Hall of India, 3rd Edition, 2008.

3. J.Gower, "Optical Communication System", Prentice Hall of India, 2001.

EC6703 EMBEDDED AND REAL TIME SYSTEMS

UNIT I INTRODUCTION TO EMBEDDED COMPUTING AND ARM PROCESSORS

WEEK-1 Complex systems and micro processors– Embedded system design process –Design example: Model train controller- Instruction sets preliminaries - ARM Processor

WEEK-2 CPU: programming input and output- supervisor mode, exceptions and traps

WEEK-3 – Co-processors- Memory system mechanisms – CPU performance- CPU power consumption.

WEEK-4 UNIT TEST-I

UNIT II EMBEDDED COMPUTING PLATFORM DESIGN

The CPU Bus-Memory devices and systems–Designing with computing platforms – consumer electronics architecture

WEEK-5 – platform-level performance analysis - Components for embedded programs- Models of programs- Assembly, linking and loading, compilation techniques- Program level performance analysis – Software performance optimization

WEEK 6– Program level energy and power analysis and optimization – Analysis and optimization of program size- Program validation and testing

UNIT TEST-II

UNIT III PROCESSES AND OPERATING SYSTEMS

WEEK-7 Introduction – Multiple tasks and multiple processes – Multirate systems- Preemptive real-time operating systems- Priority based scheduling- Interprocess communication mechanisms

WEEK-8 Evaluating operating system performance- power optimization strategies for processes – Example Real time operating systems-POSIX-Windows CE.

WEEK-9 & 10 PRE MODEL EXAM

UNIT IV SYSTEM DESIGN TECHNIQUES AND NETWORKS

Design methodologies- Design flows - Requirement Analysis – Specifications

WEEK-11 System analysis and architecture design Quality Assurance techniques- Distributed embedded systems

WEEK-12 MPSoCs and shared memory multiprocessors.

UNIT TEST-IV

UNIT V CASE STUDY

WEEK-13 Data compressor - Alarm Clock - Audio player - Software modem-Digital still camera

WEEK-14 Telephone answering machine-Engine control unit – Video accelerator.

WEEK-15, 16 & 17 -MODEL EXAMINATION

TEXT BOOKS

1. Marilyn Wolf, "Computers as Components - Principles of Embedded Computing System Design", Third Edition "Morgan Kaufmann Publisher (An imprint from Elsevier), 2012.

REFERENCE BOOKS

1. Jonathan W.Valvano, "Embedded Microcomputer Systems Real Time Interfacing", Third Edition Cengage Learning, 2012.
2. David. E. Simon, "An Embedded Software Primer", 1st Edition, Fifth Impression, Addison-Wesley Professional, 2007.
3. Raymond J.A. Buhr, Donald L.Bailey, "An Introduction to Real-Time Systems- From Design to Networking with C/C++", Prentice Hall, 1999.
4. C.M. Krishna, Kang G. Shin, "Real-Time Systems", International Editions, Mc Graw Hill 1997
5. K.V.K.K.Prasad, "Embedded Real-Time Systems: Concepts, Design & Programming", Dream Tech Press, 2005.
6. Sriram V Iyer, Pankaj Gupta, "Embedded Real Time Systems Programming", Tata Mc Graw Hill, 2004.

IT6005 DIGITAL IMAGE PROCESSING

UNIT I DIGITAL IMAGE FUNDAMENTALS

WEEK-1 Introduction – Origin – Steps in Digital Image Processing – Components

WEEK-2 Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization

WEEK-3 Relationships between pixels - color models.

WEEK-4 UNIT TEST-I

UNIT II IMAGE ENHANCEMENT

Spatial Domain: Gray level transformations – Histogram processing

WEEK-5 Basics of Spatial Filtering–Smoothing and Sharpening Spatial Filtering, **Frequency Domain:** Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters

WEEK 6 Ideal, Butterworth and Gaussian filters.

UNIT TEST-II

UNIT III IMAGE RESTORATION AND SEGMENTATION

WEEK 7 Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering **Segmentation:** Detection of Discontinuities

WEEK-8 Edge Linking and Boundary detection – Region based segmentation- Morphological processing- erosion and dilation

WEEK-9 & 10 PRE MODEL EXAM

UNIT IV WAVELETS AND IMAGE COMPRESSION

Wavelets – Subband coding - Multiresolution expansions

WEEK-11 Compression: Fundamentals – Image Compression models – Error Free Compression Variable Length Coding – Bit-Plane Coding – Lossless Predictive Coding

WEEK-12 Lossy Compression – Lossy Predictive Coding – Compression Standards.

UNIT TEST-IV

UNIT V IMAGE REPRESENTATION AND RECOGNITION

WEEK-13 Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description
WEEK-14 Shape number – Fourier Descriptor, moments- Regional Descriptors –Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.
WEEK-15 , 16 & 17 MODEL EXAMINATION

TEXT BOOKS

Rafael C. Gonzales, Richard E. Woods, "Digital Image Processing", Third Edition, Pearson Education, 2010.

REFERENCE BOOKS

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", Third Edition Tata Mc Graw Hill Pvt. Ltd., 2011.
2. Anil Jain K. "Fundamentals of Digital Image Processing", PHI Learning Pvt. Ltd., 2011.
3. Willliam K Pratt, "Digital Image Processing", John Willey, 2002.
4. Malay K. Pakhira, "Digital Image Processing and Pattern Recognition", First Edition, PHI Learning Pvt. Ltd., 2011.
5. http://eeweb.poly.edu/~onur/lectures/lectures.html.
6. http://www.caen.uiowa.edu/~dip/LECTURE/lecture.html

EC6011 ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY

UNIT I BASIC THEORY

WEEK-1 Introduction to EMI and EMC, Intra and inter system EMI, Elements of Interference, Sources and Victims of EMI
WEEK-2 Conducted and Radiated EMI emission and susceptibility, Case Histories, Radiation hazards to humans,
WEEK-3 Various issues of EMC, EMC Testing categories, EMC Engineering Application
WEEK-4 UNIT TEST-I

UNIT II COUPLING MECHANISM

Electromagnetic field sources and Coupling paths, Coupling via the supply network, Common mode coupling

WEEK 5 Differential mode coupling, Impedance coupling, Inductive and Capacitive coupling, Radiative coupling, Ground loop coupling, Cable related emissions

WEEK-6 coupling, Transient sources, Automotive transients.

UNIT TEST-II

UNIT III EMI MITIGATION TECHNIQUES

WEEK-7 UNIT TEST-III

Working principle of Shielding and Murphy‟s Law, LF Magnetic shielding, Apertures and shielding effectiveness, Choice of Materials for H, E, and free space fields, Gasketting and sealing, PCB Level shielding

WEEK-8 Principle of Grounding, Isolated grounds, Grounding strategies for Large systems, Grounding for mixed signal systems, Filter types and operation, Surge protection devices, Transient protection.

WEEK-9 & 10

UNIT IV STANDARDS AND REGULATION

Need for Standards, Generic/General Standards for Residential and Industrial environment

WEEK-11 Basic Standards, Product Standards, National and International EMI Standardizing Organizations; IEC, ANSI, FCC, AS/NZS, CISPR, BSI, CENELEC, ACEC.

WEEK 12 Electro Magnetic Emission and susceptibility standards and specifications, MIL461E Standards.

UNIT TEST-IV

UNIT V EMI TEST METHODS AND INSTRUMENTATION

WEEK-13 Fundamental considerations, EMI Shielding effectiveness tests, Open field test, TEM cell for immunity test, Shielded chamber , Shielded anechoic chamber, EMI test receivers, Spectrum analyzer, EMI test wave simulators

WEEK-14 - EMI coupling networks, Line impedance stabilization networks, Feed through capacitors, Antennas, Current probes, MIL -STD test methods, Civilian STD test methods.

WEEK- 15 , 16 & 17 -MODEL EXAMINATION

TEXTBOOKS:

Clayton Paul, "Introduction to Electromagnetic Compatibility", Wiley Interscience, 2006

.

REFERENCES:

1. V Prasad Kodali, "Engineering Electromagnetic Compatibility", IEEE Press, Newyork, 2001.

2. Henry W. Ott, "Electromagnetic Compatibility Engineering", John Wiley & Sons Inc, Newyork, 2009

3. Daryl Gerke and William Kimmel, "EDN"s Designer"s Guide to Electromagnetic Compatibility", Elsevier Science & Technology Books, 2002

4. W Scott Bennett, "Control and Measurement of Unintentional Electromagnetic Radiation", John Wiley & Sons Inc., (Wiley Interscience Series) 1997.

5. Dr Kenneth L Kaiser, "The Electromagnetic Compatibility Handbook", CRC Press 2005,

EC6012 CMOS ANALOG IC DESIGN

UNIT I SAMPLE AND HOLD

WEEK-1 Properties of MOS Switches, multiplexed input architectures

WEEK-2 recycling architecture, open and closed loop sampling architectures

WEEK-3 switched capacitor and current mode architectures.

WEEK-4- UNIT TEST-I

UNIT II BUILDING BLOCK OF DATA CONVERSION CIRCUITS:

Amplifiers, open loop and closed loop amplifiers

WEEK-5 gain boosting, common mode feedback, bipolar, CMOS

WEEK- 6 BiCMOS comparators.

UNIT TEST-II

UNIT III PRECISION TECHNIQUES

WEEK-7 Comparator cancellation, input and output offset storage principles

WEEK-8 comparators using offset cancelled latches, opamp offset cancellation, ADC and DAC calibration techniques.

WEEK-9 &10 PRE MODEL EXAM

UNIT IV ADC/DAC ARCHITECTURES

DAC Performance metrics, reference multiplication and division,

WEEK-11 switching and logical functions of DACs, Current steering architectures, DAC Performance metrics, Flash ADC architecture

WEEK- 12 Gray encoding, thermometer encoding and metastability.

UNIT TEST-IV

UNIT V OVER SAMPLING CONVERTERS

WEEK-13 Delta sigma modulators, alternative modulator architectures, quantization and noise shaping, decimation filtering

WEEK-14 - implementation of Delta sigma modulators, delta sigma DACs,

WEEK-15 , 16 & 17 -MODEL EXAMINATION

TEXT BOOK

B.Razavi "Data Conversion System Design" IEEE Press and John Wiley, 1995.

REFERENCES

1 .Phillip Allen and Douglas Holmberg "CMOS Analog Circuit Design" Second Edition, Oxford University Press, 2004.

EC6711 EMBEDDED LABORATORY

1.Study of ARM evaluation system

2. Interfacing ADC and DAC.

3. Interfacing LED and PWM.

4. Interfacing real time clock and serial port.
5. Interfacing keyboard and LCD.
6. Interfacing EPROM and interrupt.
7. Mailbox.
8. Interrupt performance characteristics of ARM and FPGA.
9. Flashing of LEDS.
10. Interfacing stepper motor and temperature sensor.
11. Implementing zigbee protocol with ARM.

EC6712 OPTICAL AND MICROWAVE LABORATORY

OPTICAL EXPERIMENTS

1. DC Characteristics of LED and PIN Photo diode
2. Mode Characteristics of Fibers
3. Measurement of connector and bending losses
4. Fiber optic Analog and Digital Link- frequency response(analog) and eye diagram (digital)
5. Numerical Aperture determination for Fibers
6. Attenuation Measurement in Fibers

MICROWAVE EXPERIMENTS

1. Reflex klystron or Gunn diode characteristics and basic microwave parameter measurement such as VSWR, frequency, wavelength.
2. Directional Coupler Characteristics.
3. Radiation Pattern of Horn Antenna.
4. S-parameter Measurement of the following microwave components (Isolator, Circulator, E plane Tee, H Plane Tee, Magic Tee)
5. Attenuation and Power Measurement

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