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(13A52601) MANAGEMENT SCIENCE

Course Objective:

The objective of this course is to equip the student the fundamental knowledge of Management Science and its application to effective management of human resources, materials and operations of an organization. It also aims to expose the students about the latest and contemporary developments in the field of management.

Learning Outcome:

This course enables the student to know the principles and applications of management knowledge and exposure to the latest developments in the field. This helps to take effective and efficient managerial decisions on physical and human resources of an organization. Besides, the knowledge of Management Science facilitates for his/her personal and professional development.

UNIT I

INTRODUCTION TO MANAGEMENT

Definition of Management- Function of Management- Management as a Science and Art- Management as a Profession- Universality of Management- Henri Faylo's Administrative Theory – Elton Mayo's Human Relations Movement- Systems theory – Contingency theory- Monetary and non-monetary incentives to motivate work teams- Leadership –Definition- Qualities of successful leaders- Different leadership styles.

UNIT II

ORGANIZATION DESIGN AND STRUCTURE

Organization design and structure- Principles—Types of organization structure-Mechanic and Organic Structures- Line organization- Line & Staff organization- Functional Organization – Matrix organization structures- merits and demerits- Departmentation and Decentralization-Power and Authority- Delegation of authority-Principles for effective delegation of authority.

UNIT III

HUMAN RESOURCE AND MATERIALS MANAGEMENT

Concept of HRM-functions – Human Resource Planning-Job Analysis-Recruitment and Selection-Training and Development- Performance appraisal –methods- Wage and Salary Administration-Grievances handling Procedure-Material Management- Need for Inventory control- Economic order quantity- ABC analysis- Management of purchase, stores and stores records.-Marketing Management – Concept- Channels of distribution- Marketing mix and product mix.

UNIT IV

MANAGEMENT OF OPERATIONS & PROJECT MANAGEMENT

Nature of organizational control- Marketing control- HR control- effective control systems-Operations Management- Essentials of operations management- Trends in operational management-Designing operation system for effective management of an organization-Project Management – Network Analysis-PERT and CPM-Project crashing (Simple problems)

UNIT V

CONTEMPORARY MANAGEMENT ISSUES

Strategic Management-Concept- Mission-Vision-Core values-Setting objectives-Corporate planning – Environmental scanning-SWOT analysis- Steps in strategy formulation & implementation-Management Information System (MIS)- Enterprise Resource Planning (ERP)-Just-in-Time (JIT)-Total Quality Management (TQM) – Supply Chain Management-Six Sigma-Business Process Outsourcing (BPO).

Text Books:

1. *Stoner, Freeman, Gilbert, Management, Pearson, Six Edition 2008*
2. *Aryasri: Management Science, Fourth Edition TMH, 2012.*

Reference Books:

1. Vijay Kumar & Apparo, Introduction to Management Science, Cengage, 2011.
2. Kotler Philip & Keller Kevin Lane: Marketing Management, 14th Edition, Pearson, 2012.
3. Aswathappa, Human Resource Management, Himalaya, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2011.
5. Schermerhorn, Capling, Poole & Wiesner: Management, Wiley, 2012.
6. Joseph M Putti, Management Principles, Mc Millan Publishers, 2012.

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(13A04701) VLSI DESIGN

Course Objective:

- *To understand VLSI circuit design processes.*
- *To understand basic circuit concepts and designing Arithematic Building Blocks.*
- *To have an overview of Low power VLSI.*

Learning Outcome:

- *Will be able to do VLSI circuit design.*
- *Will be able to do basic circuit concepts and designing Arithematic Building Blocks.*

UNIT I

Introduction: Brief Introduction to IC technology – MOS, PMOS, NMOS, CMOS & BiCMOS technologies – Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation, Probe testing, Integrated Resistors and Capacitors.

Basic Electrical Properties of MOS and BiCMOS Circuits: $\mathbf{I_{ds} - V_{ds}}$ relationships, MOS transistor threshold Voltage, $\mathbf{g_m}$, $\mathbf{g_{ds}}$, figure of merit $\boldsymbol{\omega_0}$; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT II

Basic Circuit Concepts: Sheet Resistance R_s and its concepts to MOS, Area Capacitance calculations, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out.

VLSI Circuit Design Processes: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2µm CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT III

Gate level Design: Logic gates and other complex gates, Switch logic, Alternate gate circuits.

Physical Design: Floor-Planning, Placement, routing, Power delay estimation, Clock and Power routing

UNIT IV

Subsystem Design: Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Counters, High Density Memory Elements.

VLSI Design styles: Full-custom, Standard Cells, Gate-arrays, FPGAs, CPLDs and Design Approach for Full-custom and Semi-custom devices.

UNIT V

VHDL Synthesis: VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools.

Test and Testability: Fault-modeling and simulation, test generation, design for testability, Built-in-self-test.

Text Books:

1. *Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, "Essentials of VLSI circuits and systems", PHI, 2013 Edition.*
2. *K.Lal Kishore and V.S.V. Prabhakar, "VLSI Design", IK Publishers*

Reference Books:

1. *Weste and Eshraghian, "Principles of CMOS VLSI Design", Pearson Education, 1999.*
2. *Wayne Wolf, "Modern VLSI Design", Pearson Education, 3rd Edition, 1997.*
3. *John P. Uyemura, "Chip Design for Submicron VLSI: CMOS layout and Simulation", Thomson Learning.*
4. *John P. Uyemura, "Introduction to VLSI Circuits and Systems", John wiley, 2003.*
5. *John M. Rabaey, "Digital Integrated Circuits", PHI, EEE, 1997.*

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(13A04702) OPTICAL FIBRE COMMUNICATION

Course Objective:

- *To learn the basic concepts of fibre optics communications.*
- *To make the students learn the system with various components or process for various applications.*
- *To enlighten the student with latest trends in optical communications.*

Learning Outcome:

- *Graduate will demonstrate the ability to design a system, component or process as per needs and specification.*
- *Students can learn about SONET/SDH and its application.*

UNIT I

Introduction to Optical Fibers: Evolution of fiber optic system- Element of an Optical Fiber Transmission link- Ray Optics-Optical Fiber Modes and Configurations –Mode theory of Circular Wave guides- Overview of Modes-Key Modal concepts- Linearly Polarized Modes –Single Mode Fibers-Graded Index fiber structure.

UNIT II

Signal Degradation Optical Fibers: Attenuation – Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, 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, Pulse Broadening in GI fibers-Mode Coupling –Design Optimization of SM fibers-RI profile and cut-off wavelength.

UNIT III

Fiber Optical Sources and Coupling : 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 –Resonant frequencies – Temperature effects, Introduction to Quantum laser, source-to-fiber Power Launching, Lensing schemes, Fibre –to- Fibre joints, Fibre splicing.

UNIT IV

Fiber Optical Receivers : PIN and APD diodes –Photo detector noise, SNR, Detector Response time, Avalanche Multiplication Noise –Comparison of Photo detectors –Fundamental Receiver Operation – preamplifiers, Error Sources –Receiver Configuration –Probability of Error – Quantum Limit.

UNIT V

System Design and Applications : Design of Analog Systems: system specification, power budget, bandwidth budget

Design of Digital Systems: system specification, rise time budget, power budget, Receiver sensitivity.**Applications**: Telephony, Telemetry, video distribution, military applications, passive and active sensing.

Text Books:

1. *Gerd Keiser, "Optical Fiber Communication" McGraw –Hill International, Singapore, 3rd ed., 2000.*
2. *J.Senior, "Optical Communication, Principles and Practice", Prentice Hall of India, 1994.*

Reference Books

1. *Max Ming-Kang Liu, "Principles and Applications of Optical Communications", TMH, 2010.*
2. *S.C.Gupta, "Text book on optical fiber communication and its applications", PHI, 2005.*
3. *Satish Kumar, "Fundamentals of Optical Fiber communications", PHI, 2009.*

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(13A04703) EMBEDDED SYSTEMS

Course Objective:

- *To understand the fundamental concepts of Embedded systems.*
- *To learn the kernel of RTOS, architecture of ARM processor.*
- *To know various embedded Tools.*

Learning Outcome:

- *Learns the fundamental concepts of Embedded systems.*
- *Learns the kernel of RTOS, architecture of ARM processor*
- *Becomes aware of various embedded Tools.*

UNIT I

Introduction to Embedded Systems: Embedded Systems, Processor embedded into a system, Embedded hardware units and devices in a system, Embedded software in a system, Examples of embedded systems, Embedded system-on-chip (Soc), Design process in embedded systems, Formalization of embedded systems, Classification of embedded systems, Skills required for an embedded system designer.

UNIT II

8051 Microcontroller: Architecture: Hardware and Features of 8051; Addressing modes of 8051, Instruction set of 8051, Assembly language programming of 8051, External memory interfacing with 8051, 8051 Parallel I/O Ports, 8051 Interrupts, Timer and Counter Programming.

UNIT III

Advanced Processors: ARM7 Processor:-Architecture, Features; SHARC Processor:-Architecture, Features.

Devices and Communication Buses for Devices and Network: I/O types and examples, serial communication devices, parallel port devices, wireless devices, Timer and Counting devices, Watchdog timer, Real time clock.

UNIT IV

Device Drivers and Interrupts Service Mechanism: Programmed I/O Busy-wait Approach without Interrupt service mechanism, ISR Concept, Interrupt Sources, Interrupt handling mechanism, Multiple Interrupts, DMA, Device driver programming.

Interprocess Communication and Synchronization of Process, Threads and Tasks: Multiple process in an application, Multiple threads in an application, Tasks, Task states, Task and Data, Clear cut distinction between functions, ISRS and tasks by their characteristics.

UNIT V

Real Time Operating Systems: OS Services, Process Management, Timer functions, Event functions, Memory management, Device file and I/O Management, Interrupt Routines in RTOS environment and Handling of Interrupt Source Calls, Real Time Operating Systems, Basic Design using an RTOS, RTOS Task Scheduling Models, Interrupt Latency and Response of the Tasks as Performance Metrics, OS Security Issues.

Text Books:

1. *Raj Kamal, "Embedded Systems", Tata Mcgraw Hill(TMH) Second Edition.*
2. *Kenneth J.Ayala Penram, "The 8051 Microcontroller", International (PI) Second Edition*

Reference Books:

1. *Frank Vahid, Tony D. Givargis, "Embedded System Design – A Unified Hardware/Software Introduction", John Wiley, 2002.*

2.*KVKK Prasad, "Embedded / Real Time Systems" Dreamtech Press, 2005.*

3. Jonathan W. Valvano, Brooks / Cole, "Embedded Microcomputer Systems", Thompson Learning.

4. David E. Simon, "An Embedded Software Primer", Pearson Ed., 2005.

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(13A04704) DIGITAL IMAGE PROCESSING
Elective-II

Course Objective:

- *To learn the fundamentals of Image Processing.*
- *To learn sampling and reconstruction procedures.*
- *To learn the various transforms used in image Processing.*
- *To study various concepts of image enhancement, reconstruction and image compression.*
- *To design image processing systems.*

Learning Outcome:

- *Develops ability to identify, formulate &solve problems involving images.*
- *Develops ability to design &conduct experiments, analyze &interpret image data.*
- *To design a software, Component or process as per needs &specifications.*
- *It will demonstrate the skills to use modern engineering tools, software's &equipment to analyze problems.*
- *Develop confidence for self-education&ability for life-long learning.*
- *It will show the ability to participate &try to succeed in competitive Exams.*

UNIT I

Digital Image fundamentals: Digital Image representation – Digital image processing System – Visual Perception- Sampling and Quantization - Basic relationships between pixels, and imaging geometry.

UNIT II

Image Transforms: Discrete Fourier Transform – Properties of 2 – D Fourier Transform – Fast Fourier Transform, Walsh, Hadamard, Discrete cosine transforms.

UNIT III

Image Enhancement: Background enhancement by point processing Histogram processing, Spatial filtering, Enhancement in frequency Domain, Image smoothing, Image sharpening, Colour images

UNIT IV

Image Restoration: Degradation model, Algebraic approach to restoration – Inverse filtering – Least Mean Square filters, Constrained Least square restoration.

UNIT V

Image Coding and Segmentation : Fidelity criteria, Encoding process, transform encoding, Detection and discontinuities, Edge linking and Boundary detection, Boundary description.

Text Books:

1. *R. C .Gonzalez & R.E. Woods, "Digital Image Processing", Addison Wesley/Pearson education, 3rd Edition, 2010.*
2. *A .K. Jain, "Fundamentals of Digital Image processing", PHI.*

Reference Books:

1. *Rafael C. Gonzalez, Richard E woods and Steven L.Eddins, "Digital Image processing using MATLAB", Tata McGraw Hill, 2010.*
2. *S jayaraman, S Esakkirajan, T Veerakumar, "Digital Image processing",Tata McGraw Hill*
3. *William K. Pratt, "Digital Image Processing", John Wilely, 3rd Edition, 2004.*

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(13A04705) RADAR ENGINEERING AND NAVIGATIONAL AIDS
(Elective-II)

Course Objective:

- *This course describes the understanding of the components of a radar system and their relationship to overall system performance*
- *To become familiar with design, operation, and applications of various types of radar systems*
- *To understand clutter and its effects of radar system performance and learn the principle of target track and various types of radar antennas.*

Learning Outcome:

- *To become familiar with fundamentals of radar.*
- *To gain in knowledge about the different types of radar and their operation.*
- *Need for signal detection in radar and various radar signal detection techniques.*
- *Will demonstrate the ability to design a system component or process as per needs & specifications.*
- *Will demonstrate the ability to identify, formulate & solve engineering problems.*
- *Will show the ability to participate and try to succeed in competitive examination*

UNIT I

Nature of Radar and Radar equation – Simple form of Radar equation – Radar block diagram and operation, Radar frequencies, Applications of Radar.

Minimum Detectable signal – Receiver noise, Probability – Density functions, signal – to – noise ratio, Radar cross section of targets, cross-section fluctuations system losses.

UNIT II

Radar components : RF amplifier, TWT, CFA, Modulators, mixers – Conversion loss, Noise figure, Balanced mixer, Image recovery mixer, Duplexers – Branch type, Balanced type and solid state duplexers, limiters, Displays – CRT displays, A,B,C,D – scopes PPI and RHI.

UNIT III

Radar systems: CW radar, frequency-modulates CW radar, multiple - Frequency CW radar. MTI radar – Delay line cancellers, Pulse repetition frequencies, Range-gated Doppler filters tracking radar – Range and angle tracking sequential lobing and conical scanning.

UNIT IV

Radio direction finding and radio ranges, the loop antenna, the goniometer, errors in direction finding the LF/MF four-course radio range, VHF-VOR, VOR receiving equipment.

UNIT V

Hyperbolic systems of navigation & DME: TACAN: Loran-A, Loran-C, The decca navigation system, decca receivers.

DMA-operation, TACAN STACAN equipment.

Text Books:

1. *M.I.Skolnik, "Introduction to radar systems", 2nd edition, TMH 1980.*
2. *N.S.Nagaraja, "Elements on electronic navigation", 2nd edition, TMH 1996.*

Reference Books:

1. *1.G.M.Miller, "Modern electronic communication", Prentice Hall, 6th Edition, 1999.*
2. *Kennedy & Davis, "Electronic communication systems", Mc Graw Hill, 4th Edition, 1993*.

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(13A04706) TELEVISION ENGINEERING
(Elective-II)

Course Objective:

- *To understand working principles of Monochrome and color television*
- *To gain sufficient knowledge regarding different modules present in the TV transmitter and receiver and their design considerations*
- *To get adequate knowledge regarding functioning of modern televisions system such as DTH*

Learning Outcome:

After completion of this course the student will be able to

- *Get complete knowledge regarding the working principles involved in both Monochrome and Color Television*
- *Get Adequate knowledge regarding different modules present in the TV transmitter and receiver and their design considerations*
- *Get familiarized with principles involved in the of functioning of modern televisions system such as DTH*

UNIT I

Fundamentals of Telivision :Geometry form and Aspect Ratio - Image Continuity - Number of scanning lines - Interlaced scanning - Picture resolution - Camera tubes- Image orthicon - vidicon-plumbicon-silicon diode array vidicon-solid state image scanners- monochrome picture tubes-composite video signal-video signal dimension- horizontal sync. Composition- vertical sync. Details – functions of vertical pulse train – scanning sequence details. Picture signal transmission – positive and negative modulation – VSB transmission sound signal transmission – standard channel bandwidth.

UNIT II

Monochrome Television Transmitter and Receiver : TV transmitter – TV signal propagation – Interference – TV transmission Antennas – Monochrome TV receiver – RF tuner – UHF, VHF tuner-Digital tuning techniques- AFT-IF subsystems - AGC – Noise cancellation- Video and sound inter carrier detection- vision IF subsystem- video amplifiers requirements and configurations - DC re-insertion - Video amplifier circuits- Sync separation – typical sync processing circuits- Deflection current waveform – Deflection Oscillators – Frame deflection circuits – requirements- Line Deflection circuits – EHT generation – Receiver Antennas.

UNIT III

Essentials of Colour Television : Compatibility – colour perception- Three colour theory- luminance, hue and saturation-colour television cameras- values of luminance and colour difference signals-colour television display tubes- delta – gun-precision – in-line and Trinitron colour picture tubes-purity and convergence- purity and static and dynamic convergence adjustments- pincushion correction techniques- automatic degaussing circuit- grey scale tracking – colour signal transmission-bandwidth- modulation of colour difference signals – weighting factors- Formation of chrominance signal.

UNIT IV

Colour Television systems:NTSC colour TV system- NTSC colour receiver- limitations of NTSC system – PAL colour TV system – cancellation of phase errors- PAL –D colour system- PAL coder – Pal-Decolour receiver- chromo signal amplifier- separation of U and V signals- colour burst separation – Burst phase Discriminator – ACC amplifier- Reference Oscillator- Ident and colour killer

circuits- U and V demodulators- Colour signal matrixing – merits and demerits of the PAL system – SECAM system – merits and demerits of SECAM system.

UNIT V

Advanced Television Systems : Satellite TV technology- Cable TV – VCR- Video Disc recording and playback- Tele Text broadcast receiver – digital television – Transmission and reception- projection Television – Flat panel display TV receiver – Sterio sound in TV – 3D TV – EDTV – Digital equipments for TV studios.

Text Books:

1. *R.R.Gulati, " Monochrome Television Practice, Principles, Technology and servicing , New age International Publishes, Second edition, 2004.*
2. *R.R.Gulati "Monochrome and colour television ", New age Internationl Publisher, 2003.*

Reference Books:

1. *A.M Dhake, "Television and Video Engineering", TMH, Second edition, 2003.*
2. *S.P.Bali, " Color Television, Theory and Practice", TMH, 1994.*

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(13A04707) VLSI & EMBEDDED SYSTEMS LABORATORY

Note: The students are required to perform any **Five** Experiments from each Part of the following.

Part-A: VLSI Lab

Course Objective:

- *To design and draw the internal structure of the various digital integrated circuits*
- *To develop VHDL source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.*
- *To verify the logical operations of the digital IC's (Hardware) in the laboratory.*

Learning Outcome:

After completion of the course the students will be able to

- *Design and draw the internal structure of the various digital integrated circuits*
- *Develop VHDL source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.*
- *Verify the logical operations of the digital IC's (Hardware) in the laboratory*

List of Experiments:

1. Realization of Logic Gates.
2. 3 to 8 Decoder- 74138.
3. 8 x 1 Multiplexer-74151 and 2 x 4 De-multiplexer-74155.
4. 4-Bit Comparator-7485.
5. D Flip-Flop-7474.
6. Decade counter-7490.
7. Shift registers-7495.
8. ALU Design.

Equipment Required:

1. Xilinx ISE Software.
2. Digital IC's.
3. Personal Computers.
4. Necessary Hardware Kits.

Part-B: Embedded Systems Lab

Course Objective:

- To develop an algorithm, the flow diagram, source code in Embedded C and, perform the compilation
- To generate the required binary file which can be dumped into the controller and obtain the respective output control on the connected peripheral.
- To verify the logic with the necessary hardware.

Learning Outcome:

After completion of the course the students will be able to

- *Develop an algorithm, the flow diagram, source code in Embedded C and, perform the compilation.*
- *Generate the required binary file which can be dumped into the controller and obtain the respective output control on the connected peripheral.*
- *Verify the logic with the necessary hardware.*

List of Experiments:

1) To develop program for basic mathematical operations.
2) To develop a program for block operations.
3) To develop a program to generate square wave over port pins.
4) To develop a program to read keyboard and code.
5) To develop a program to drive Elevator.
6) To develop a program for temperature indicator using ADC.
7) Asynchronous serial communication.
8) DC-Motor control.

Equipment Required:

1) KEIL µ-vision 3 software.
2) Personal computers.
3) Necessary Hardware Kits (8051 Developer kit/ PIC µ-controller developers kit).
4) Necessary Interfacing boards.

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(13A04708) MICROWAVE & OPTICAL COMMUNICATIONS LAB

Course Objective:

- *To verify the characteristics of various microwave components using microwave test bench.*
- *Initiate an expose the newcomers to exciting area of optical communication*

Learning Outcome:

- *Students acquire applications and testing of microwave components.*
- *Students acquire knowledge on the various applications of optical fiber communications*
- *Students develop confidence for self education and ability for life -long learning.*

Microwave Lab (PART – A) --- Any Seven (7) Experiments

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. VSWR Measurement.
6. Impedance Measurement.
7. Frequency and Wavelength measurements using slotted section.
8. Scattering parameters of Directional Coupler.
9. Scattering parameters of Magic Tee.
10. Radiation Pattern Measurement of horn Antennas (at least two antennas).

Optical Fiber Lab (PART – B) --- Any five (5) Experiments

1. Characterization of LED.
2. Characterization of Laser Diode.
3. Intensity modulation of Laser output through an optical fiber.
4. Measurement of Data rate for Digital Optical link.
5. Measurement of Numerical Aperture of the given fiber.
6. Measurement of losses for Analog Optical link.

Equipment required for Laboratories:

1.	Regulated Klystron Power Supply	6 nos.
2.	VSWR Meter	6 nos.
3.	Milli/Micro Ammetersn	10 nos.
4.	Multi meters	10 nos.
5.	CROs	8 nos.
6.	GUNN Power Supply, Pin Moderator	4 nos.
7.	Reflex Klystron with mount	10 nos.
8.	Crystal Diodes	50 nos.
9.	Micro wave components (Attenuation)	10 nos.
10.	Frequency Meter (Direct frequency)	10 nos.
11.	Slotted line with carriage	10 nos.
12.	Probe detector	10 nos.
13.	wave guide shorts	6 nos.
14.	Pyramidal/conical Horn Antennas	4 nos.
15.	Rectangular to circular transition	2 nos.

16. Directional Couplers with different (coupling factors) 5 nos.
17. E, H, Magic Tees 2 nos. each.
18. Circulators, Isolator 10 nos.
19. Matched Loads 30 nos.
20. Antenna Training System with Tripod and Accessories 1no.

21. Fiber Optic Analog Trainer based LED 3 nos.
22. Fiber Optic Analog Trainer based laser 2nos.
23. Fiber Optic Digital Trainer 1 no.
24. Fiber cables - (Plastic, Glass)