

## 6.1 MICROWAVE AND RADAR ENGINEERING

Faculty: Anit Kumar

Week	Theory Topic	Experiment
1 <sup>st</sup>	Introduction to microwaves and its applications	To measure electronics and mechanical tuning range of a reflex klystron
2 <sup>nd</sup>	Classification on the basis of its frequency bands	
3 <sup>rd</sup>	Construction, characteristics, operating principles and applications of Multi cavity klystron Reflex klystron	
4 <sup>th</sup>	Construction, characteristics, operating principles and applications of Multi-cavity magnetron Traveling wave tube	
5 <sup>th</sup>	Construction, characteristics, operating principles and applications of Gunn diode and Impatt diode	
6 <sup>th</sup>	Rectangular and circular wave guides and their applications. Mode of wave guide	To measure VSWR of a given load.
7 <sup>th</sup>	Propagation constant of a rectangular wave guide, cut off wavelength, guide wavelength and their relationship with free space wavelength	
8 <sup>th</sup>	Impossibility of TEM mode in a wave guide	
9 <sup>th</sup>	Constructional features, characteristics and application of tees, bends, matched termination, twists	
10 <sup>th</sup>	Constructional features, characteristics and application of detector, mount, slotted section, directional coupler, fixed and variable attenuator	
11 <sup>th</sup>	Constructional features, characteristics and application of isolator, circulator and duplex, coaxial to wave guide adapter, horn antenna	To measure the Klystron frequency by slotted section method
12 <sup>th</sup>	Block diagram and working principles of microwave communication link. Troposcatter Communication-basic idea	To measure the directivity and coupling of a directional coupler.
13 <sup>th</sup>	Introduction to radar, its various applications, radar range equation (no derivation) and its applications. Block diagram and operating principles of basic pulse radar	To plot radiation pattern of a horn antenna in horizontal and vertical planes
14 <sup>th</sup>	Concepts of ambiguous range, radar area of cross-section and its dependence on frequency. Block diagram and operating principles of CW (Doppler) and FMCW radars, and their applications.	To verify the properties of magic tee.
15 <sup>th</sup>	Block diagram and operating principles of MTI radar. Radar display- PPI	
16 <sup>th</sup>	Introduction to VSAT	

## 6.2 WIRELESS AND MOBILE COMMUNICATION

Faculty: Sh. Anit Kumar

Week	Theory Topic	Experiment
1 <sup>st</sup>	Basics Advantages of wireless communication Electromagnetic waves. Frequency Spectrum used	
2 <sup>nd</sup>	Cellular Network Systems. Propagation considerations Range ,Atmospheric Effect, Geographic Effect, Fading, Doppler Effect, Multipath Effect	
3 <sup>rd</sup>	Introduction to 1G and 2G Cell area, Cell Site Structure	Study the features, specification and working of cellular mobile
4 <sup>th</sup>	Capacity of cell Frequency Reuse (Concept) ,Interference (Co-channel, Adjacent channel) Power Control for reducing Interference	Measurement of signal strength at various points from a transmitting antenna
5 <sup>th</sup>	Fundamentals of cellular network planning Coverage planning Capacity planning,Cell splitting and sectoring	Demonstration of Base Trans Receiver(BTS) with nearby cellular tower
6 <sup>th</sup>	Multiple Access Techniques for Wireless Communication Introduction to Multiple Access. Frequency Division Multiple Access	
7 <sup>th</sup>	Time Division Multiple Access (TDMA) Distinction between TDMA FDD and TDMA TDD Code Division Multiple Access (CDMA), WCDMA	Observing call processing of GSM trainer kit.
8 <sup>th</sup>	Introduction of Global Systems for Mobile Communication (GSM) and its architecture	
9 <sup>th</sup>	Introduction of CDMA System, comparison of CDMA and GSM Systems	
10 <sup>th</sup>	Introduction of GPRS, EDGE, Bluetooth and Wi-fi.	
11 <sup>th</sup>	Introduction to Architecture and Features of UMTS HSPA ( High Speed Packet Access )	Visit to Mobile Switching Centre
12 <sup>th</sup>	Features and Architecture of LTE (Long Term Evolution)	
13 <sup>th</sup>	Assembling and disassembling of GSM phone	Repair of a GSM mobile phone
14 <sup>th</sup>	Study parts of Mobile Phone	
15 <sup>th</sup>	Testing of various parts	

### 6.3 ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

Faculty: Sh. Yogender Singh

Week	Theory Topic
1 <sup>st</sup>	Entrepreneur Concept /Meaning and its need Qualities and functions of entrepreneur and barriers in entrepreneurship
2 <sup>nd</sup>	Sole proprietorship and partnership forms and other forms of business organisations Schemes of assistance by entrepreneurial support agencies at National, State, District –level, organisation: NSIC, NRDC, DC, MSME, SIDBI, NABARD, NIESBUD, HARDICON Ltd., Commercial Banks, SFC's TCO, KVIB, DIC, Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks
3 <sup>rd</sup>	Scanning of the business environment Salient features of National and Haryana State industrial policies and resultant business opportunities Types and conduct of market survey
4 <sup>th</sup>	Assessment of demand and supply in potential areas of growth Identifying business opportunity Considerations in product selection Converting an idea into a business opportunity
5 <sup>th</sup>	Preliminary project report Detailed project report including technical, economic and market feasibility Common errors in project report preparations Exercises on preparation of project report Sample project report
6 <sup>th</sup>	Definitions and importance of management Functions of management: Importance and process of planning, organising, staffing, directing and controlling Principles of management (Henri Fayol, F.W. Taylor) Concept and structure of an organisation Types of industrial organisations and their advantages  Line organisation, staff organisation Line and staff organisation Functional Organisation
7 <sup>th</sup>	Leadership <ul style="list-style-type: none"> <li>• Definition and Need</li> <li>• Qualities and functions of a leader</li> <li>• Manager Vs leader</li> <li>• Types of leadership</li> <li>• Case studies of great leaders</li> </ul> Motivation

	<ul style="list-style-type: none"> <li>• Definition and characteristics</li> <li>• Importance of self motivation</li> <li>• Factors affecting motivation</li> <li>• Theories of motivation (Maslow, Herzberg, Douglas, McGregor)</li> </ul>
<b>8<sup>th</sup></b>	<p>Human Resource Management</p> <ul style="list-style-type: none"> <li>• Introduction and objective</li> <li>• Introduction to Man power planning, recruitment and selection</li> <li>• Introduction to performance appraisal methods</li> </ul> <p>Material and Store Management</p> <ul style="list-style-type: none"> <li>• Introduction functions, and objectives</li> <li>• ABC Analysis and EOQ</li> </ul>
<b>9<sup>th</sup></b>	<p>Marketing and sales</p> <ul style="list-style-type: none"> <li>• Introduction, importance, and its functions</li> <li>• Physical distribution</li> <li>• Introduction to promotion mix</li> <li>• Sales promotion</li> </ul> <p>Financial Management</p> <ul style="list-style-type: none"> <li>• Introductions, importance and its functions</li> <li>• knowledge of income tax, sales tax, excise duty, custom duty, VAT, GST</li> </ul>
<b>10<sup>th</sup></b>	<p>Introduction and importance of Healthy Work Culture in organization</p> <p>Components of Culture</p> <p>Importance of attitude, values and behavior</p> <p>Behavioural Science – Individual and group behavior.</p>
<b>11<sup>th</sup></b>	<p>Professional ethics – Concept and need of Professional Ethics and human values.</p> <p>Meaning and definition of accounting.</p> <p>Double entry system of book keeping</p>
<b>12<sup>th</sup></b>	<p>Trading account, PLA account and balance sheet of a company</p> <p>Objectives of Financial Management</p> <p>Profit Maximization v/s Wealth Maximization</p>
<b>13<sup>th</sup></b>	<p>Total Quality Management (TQM)</p> <ul style="list-style-type: none"> <li>• Statistical process control</li> <li>• Total employees Involvement</li> <li>• Just in time (JIT)</li> </ul>
<b>14<sup>th</sup></b>	<p>Intellectual Property Right (IPR)</p> <ul style="list-style-type: none"> <li>• Introduction, definition and its importance</li> <li>• Infringement related to patents, copy right, trade mark</li> </ul>
<b>15<sup>th</sup></b>	<p>Revision and doubts</p>