

**MRSPTU UNDER GRADUATE OPEN ELECTIVES-I 2016 BATCH ONWARDS  
(UPDATED ON 26.11.2017)**

<b>UG OPEN ELECTIVES-I 2016 BATCH ONWARDS</b>		
Internal	External	Total
40	60	100

**NOTE: MORE COURSES MAY BE ADDED IN THIS LIST LATER ON**

<b>UG OPEN ELECTIVES-I 2016 BATCH ONWARDS</b>		
<b>COURSE CODE</b>	<b>COURSE</b>	<b>NOT APPLICABLE FOR PROGRAMMES</b>
<b>BFOT0-F91</b>	Plant Utilities & Control	B.Tech. Food Technology
<b>BBAD0-F91</b>	Fundamentals of Management	BBA
<b>BBAD0-F92</b>	Personnel & Industrial Management	
<b>BBAD0-F93</b>	Corporate Governance & Ethics	
<b>BECE0-F91</b>	Optical Communication	B.Tech. Electronics & Comm. Engg., B.Tech. Electronics & Telecomm. Engg., B.Tech. Electronics & Instrumentation Engg. EEE
<b>BECE0-F92</b>	Cellular and Mobile Communication	
<b>BECE0-F93</b>	Biomedical Electronics and Instrumentation	
<b>BEEE0-F91</b>	Power Plant Engineering	
<b>BEEE0-F92</b>	Analog & Digital Circuit Analysis	B.Tech. Mechanical Engg.
<b>BEEE0-F93</b>	Digital Signal Processing	
<b>BMEE0-F91</b>	Industrial Safety and Environment	
<b>BCIE0-F91</b>	Environmental Pollution	B.Tech. Civil Engg.
<b>BCIE0-F92</b>	Traffic Engineering	

**PLANT UTILITIES & CONTROL**

**Subject Code: BFOT0-F91**

**L T P C**  
**3 0 0 3**

**Contact Hrs.**

**UNIT-I**

**Properties of Steam:** Introduction – steam formation – Thermodynamic properties of steam – Sensible heat, latent heat, dryness fraction, wet fraction – superheated steam – steam table, expansion of steam

**Steam Generators:** Introduction, Classification & Boilers, Water tube, Fire tube type, Vertical tabular boilers, types of fire and water tube boilers, boiler mounting & accessories, Performance of steam generator, Evaporation rate. Performance, boiler efficiency, Factors influencing Boiler efficiency problems.

**UNIT-II**

**Fuels & Combustion:** Introduction, solid, liquid & gaseous fuel, Calorific value of fuel, flue gases per kg. of fuel, Minimum Air required per kg. of fuel, Excess Air Problems.

**Condensers** The function of a condenser in a Steam Power Plant, Vacuum, Classification, Comparison of Jet & Surface Condensers, Advantages/Disadvantages Mass of Circulating Water required in a condenser, Air Removal.

**Fitting, Safety & Maintenance:** Selection of size of steam pipes – layout of pipe lines – Energy audit of steam boilers – economy of heat utilization – boiler codes – Indian boiler regulation act – safety in steam plant maintenance

**UNIT-III**

**Gears:** Introduction, Classification of Gears, Parallel Shafts, Spur Gears Spur Rack & Pinion, Helical Gears, Intersecting Shafts, Straight Bevel Gears, Spiral Bevel Gears, Skew Shafts, Crossed Helical Gears, Worm Gear, Hypoid Gears, Gear Terminology, Pitch Circle, Pitch dia, Pitch, Circular Pitch.

**UNIT-IV**

**Lubrication:** Introduction, Physical & Chemical Test of Lubricants, Methods of Applying Lubrication, Hand oiling, drop feed cup, ring type of lubrication etc.

**Corrosion** Corrosion & its control, General Corrosion, Localized Corrosion, Pitting Corrosion etc. Factors influencing Corrosion, Combating Corrosion, Selection of material.

**Recommended Books**

1. Antonio López-Gómez Gustavo V. Barbosa-Cánovas, 'Food Plant Design', CRC Press, Boca Raton, 2005.
2. C.P. Mallet, 'Frozen Food Technology', Blackie Academic & Professional an imprint of Chapman & Hall, 1993.
3. J. Lal & Prof. J.M. Shah, 'Theory of Machine', Publishers Metropolitan Book & Co. Pvt. Ltd, Delhi-6.
4. S.S. Rattan, 'Theory of Machine', Tata McGraw Hill Publishing Co. Ltd, New Delhi, 2009.
5. P.L. Ballaney, 'Thermal Engineering', Khanna Publishers, New Delhi, 1995.

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**FUNDAMENTALS OF MANAGEMENT**

**Subject Code: BBAD0-F91**

**L T P C  
3 0 0 3**

**Duration: 40 Hrs**

**Learning Objectives:** This course aims to provide a thorough and systematic coverage of management theory and practice. The course aims at providing fundamental knowledge and exposure of the concepts, theories and practices in the field of management. It focuses on the basic roles, skills and functions of management, with special attention to managerial responsibility for effective and efficient achievement of goals.

**UNIT-I (10 Hrs)**

**Introduction to Management:** Definition, Nature, Significance and Scope. Functions of Manager, An Overview of Management Functions. Is managing a science or art? Evolution of Management Thought: Classical Approach, Scientific Management

**UNIT-II (10 Hrs)**

**Planning and Decision Making:** Types of Plans and Process of Planning, Nature of Objectives, Setting Objectives. Importance and Steps in Decision Making, Types of Decision and Decision Making Under Different Conditions. Group Decision Making. Decision Making Styles

**Organizing:** Nature and Significance, Process of Organizing, Bases of Departmentation, Delegation and Decentralization, Line & Staff relationship

**UNIT-III (10 Hrs)**

**Delegation:** Concept and Elements. Authority, Responsibility, Accountability

**Coordination:** Concept and Importance, Factors which Make Coordination Difficult, Techniques or Methods to Ensure Effective Coordination.

**UNIT-IV (10 Hrs)**

**Control:** Concept, Planning-Control Relationship, Process of Control, Traditional & Modern Techniques of Control

**Management by Objectives:** Concept, Benefits and Weaknesses

**Course Outcomes:** After completing the course student will be able to understand and explain the concept of management and its managerial perspective. It will equip students to map complex managerial aspect arise due to ground realities of an organization. They will Gain knowledge of contemporary issues in Management principles and various approaches to resolve those issues.

**Recommended Books**

1. Heinz Wehrich, Cannice & Koontz, 'Management (A Global Perspective)', Tata McGraw Hill.
2. Harold Koontz, and Heinz Wehrich, 'Essentials of Management: An international Perspective', Tata McGraw Hill.
3. Stephen Robbins & Mary coulter, 'Management', Pearson Education.
4. VSP Rao & VH Krishna, 'Managemen't', Excel Books.
5. P. Subba Rao, 'Principles of Management', Himalaya Publishing.

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**PERSONNEL & INDUSTRIAL MANAGEMENT**

**Subject Code: BBAD0-F92**

**L T P C  
3 0 0 3**

**Duration: 45 Hrs**

**Course Objectives:** The objective of the paper is to make student aware of the various functions and importance of the HR department in any organization. It is basically concerned with managing the human resources, whereby the underlying objective is to attract retain and motivate the human resources in any organization, which is the most challenging and daunting look for any organization today.

**UNIT-I (10 Hrs)**

Human Resources Management: Meaning, Scope, Objective, Functions, Roles and Importance. Interaction with other functional areas. HRM & HRD a comparative analysis, Human Resource Planning: Meaning, Process & Methods of Human Resources Planning, Job Analysis: Job Description, Job Specification.

**UNIT-II (10 Hrs)**

Recruitment & Selection: Concept, Process & Methods. Concept of Induction & Placement, Training & Development: Concept & Methods, Difference Between Training & Development, Internal Mobility: Promotion, Transfer, Demotion, Separation.

**UNIT-III (10 Hrs)**

Performance Appraisal: Concept, methods & Process. Compensation Management- Wage & Salary Administration, Elements & Methods of Wage & Salary, Incentive Plans & Fringe Benefits

**UNIT IV (10 Hrs)**

Industrial Relations: Meaning and importance. Collective Bargaining, Participative Management, Employee Grievances and their Resolution, Quality Circles.

**Course Outcome:** After completing this course the students should be able to understand the concepts, principles and processes of HRM, understand the crucial role that HRM plays in helping organizations all over the world adapt to the endless change today.

**Recommended Books**

1. Edwin B. Flippo, 'Personal Management', Tata McGraw Hill.
2. Bohlander, Snell & Vohra, 'Human Resource Management', Cengage Learning.
3. Gary Dessler, Human Resource Management, McMillan.
4. V.S.P. Rao, 'Human Resource Management', Excel Books.
5. C.B. Mamoria, 'Personal Management', Himalaya Publications.
6. T.N. Chhabra, 'Human Resource Management', Dhanpat Rai & Sons.
7. C.B. Gupta, 'Human Resource Management', Sultan Chand and Sons.
8. R.S. Dwivedi, 'HRD in India Companies', Himalaya Publications.

**CORPORATE GOVERNANCE & ETHICS**

**Subject Code: BBAD0- F93**

**L T P C  
3 0 0 3**

**Duration: 40 Hrs.**

**UNIT-I (10 Hrs.)**

Introduction to Ethics and Values and their importance in business: Ethical issues in Capitalism and Market System, Ethical and Social System. The Social Responsibility of Business, Ethical Conflict, Whistle Blowing.

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**UNIT-II (10 Hrs.)**

Ethics and Organization, Ethics in Human Resource Management and Organizational Culture, Ethics in Marketing, Ethics in Finance, Ethical Codes and Incentives in Corporate Sector.

**UNIT-III (10 Hrs)**

Broader Ethical issues in Society – Corruption, Ecological Concern, Discrimination on the Basis of Gender, Caste or Race, Ethics and Information Technology.

**UNIT-IV (10 Hrs)**

Impact of Group Policies and Laws of Ethics, Resolving Ethical dilemma.

**Corporate Governance:** Issues, Need, Transparency & Disclosure, Role of Auditors, Board of Directors and Shareholders, Corporate Social Responsibility.

**Recommended Books**

1. R.C. Shekhar, 'Ethical Choices in Business', Response Book, New Delhi.
2. S.C. Chakraborty, 'Managerial Transformation by Value', Sage Publications, New Delhi, 1993.
3. Ananta K. Giri, 'Values, Ethics and Business: Challenges for Education and Management', Rawat Publication, Jaipur.

**OPTICAL COMMUNICATION**

**Subject Code: BECE0-F91**

**L T P C**

**Duration: 38 Hrs.**

**3 0 0 3**

**Learning Objectives**

1. To facilitate the knowledge about optical fiber sources and transmission techniques
2. To Enrich the idea of optical fiber networks algorithm such as SONET/SDH and optical
3. CDMA.
4. To explore the trends of optical fiber measurement systems.

**Learning Outcomes:**

Upon completion of the Course, students will be able to:

1. Discuss the various optical fiber modes, configurations and various signal degradation factors associated with optical fiber.
2. Explain the various optical sources and optical detectors and their use in the optical communication system.
3. Analyze the digital transmission and its associated parameters on system performance.

**UNIT-I**

**Overview:** The Electromagnetic Spectrum, Properties of Light, Dual Nature of Light Concept of a photon, Wave Model, Characteristics of light waves. Concepts of information, general communication systems, evolution of Basic fiber Optic Communication System, Benefits and disadvantages of fiber Optics. Transmission Windows. Transmission Through Optical fiber, The Laws of Reflection and Refraction, Light rays and light waves, Reflection of light from optical surfaces, Refraction of light from optical interfaces, Numerical Aperture (NA).

**UNIT-II**

**Losses in Optical Fiber:** Attenuation, Material absorption losses, linear and nonlinear scattering losses, fiber bend loss, dispersion viz. inter modal dispersion and intra modal dispersion, overall fiber dispersion and polarization, attenuation and dispersion limits in fibers, self-phase modulation, combined effect of dispersion and self-phase modulation.

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Fiber Material, Couplers and Connectors: Preparation of optical fiber: liquid-phase techniques, vapor phase deposition techniques, Connector Principles, fiber End Preparation, splices, connectors.

**UNIT-III**

**Optical Sources and Detectors:** Sources: Basic principle of surface emitter LED and edge emitter LED- material used, structure, internal quantum efficiency and characteristics, LASER Diode - material used, structure, internal quantum efficiency and characteristics, working Principle and characteristics of Distributed feedback (DFB) laser. Detectors: PIN photodiode - material used, working principle & characteristics, Avalanche Photodiode: - material used, working principle and characteristics

**UNIT-IV**

**Advanced Topics:** Optical TDM, SCM, WDM and Hybrid multiplexing methods, Fiber Optic Networks, Transreceivers for Fiber-Optic Networks, Semiconductor Optical Amplifiers, Erbium Doped Fiber Amplifiers (EDFAs).

**Optical Networks:** Elements and Architecture of Fiber-Optic Network, SONET/SDH, ATM, IP, Optical Line Terminals (OLT), Optical Add-Drop Multiplexers, Optical Cross Connects.

**Recommended Books**

1. John M. Senior, 'Optical Fiber Communication Principles & Practice', PHI Publication.
2. John Gowar, 'Optical Communication Systems', PHI Publications.
3. Gerd Keiser, 'Optical Fiber Communication', McGraw Hill International Publications.
4. Bishnu P. Pal, 'Fundamentals of Fibre Optics in Telecommunication and Sensor Systems', New Age International (P) Ltd.
5. Rajiv Ramaswami, Kumar N. Sivarajan, 'Optical Networks Practical Perspective', Elsevier.

**CELLULAR AND MOBILE COMMUNICATION**

**Subject Code: BECE0-F92**

**L T P C  
3 0 0 3**

**Duration: 37 Hrs.**

**Learning Objectives**

The student should be made to:

1. Know the characteristic of cellular mobile systems
2. Learn the various elements of cellular radio systems design and interference
3. Understand the concepts behind various digital signaling schemes for fading channels
4. Be familiar the various multipath mitigation techniques.
5. Understand the various handoff techniques.

**Learning Outcomes**

At the end of the Course, the student should be able to

1. Understand cellular wireless communication systems.
2. Learn about elements of cellular radio systems.
3. Compare multipath mitigation techniques and analyze their performance.
4. Describe about hand offs and call drops.

**UNIT-I**

**Introduction to Cellular Mobile Systems:** A basic cellular system, performance criteria, Uniqueness of mobile radio environment, operation of cellular systems, planning a cellular system, analog & digital cellular systems.



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**Cellular Wireless Communication Systems:** Second generation cellular systems: GSM specifications and Air Interface - specifications of various units, 2.5 G systems: GPRS/EDGE specifications and features, 3G systems: UMTS & CDMA 2000 standards and specifications.

**UNIT-II**

**Elements of Cellular Radio Systems Design:** General description of the problem, concept of frequency reuse channels, co-channel interference reduction factor, desired C/I from a normal case in an omni directional antenna system, cell splitting, consideration of the components of cellular systems.

**Interference:** Introduction to co-channel interference, real time co-channel interference, cochannel measurement design of antenna system, antenna parameter and their effects, diversity receiver in co-channel interference – different types.

**UNIT-III**

**Cell Coverage for Signal & Traffic:** General introduction, obtaining the mobile point to point mode, propagation over water or flat open area, foliage loss, propagation near in distance, long distance propagation, point to point prediction model- characteristics, cell site, antenna heights and signal coverage cells, mobile to mobile propagation.

**Cell Site Antennas and Mobile Antennas:** Characteristics, antenna at cell site, mobile antennas, Frequency Management and Channel Assignment, Frequency management, fixed channel assignment, non-fixed channel assignment, traffic & channel assignment.

**UNIT-IV**

**Hand Off, Dropped Calls:** Why hand off, types of handoff and their characteristics, dropped call rates & their evaluation.

**Operational Techniques:** Parameters, coverage hole filler, leaky feeders, cell splitting and small cells, narrow beam concept.

**Recommended Books:**

1. C.Y. Lee William, 'Mobile Cellular Telecommunications', McGraw Hill.
2. Kamilo Feher, 'Wireless and Digital Communications', PHI.
3. T.S. Rappaport, 'Wireless Communication, Principles & Practice', PHI.

**BIOMEDICAL ELECTRONICS AND INSTRUMENTATION**

**Subject Code: BECE0-F93**

**L T P C**

**Duration: 38 Hrs.**

**3 0 0 3**

**Learning Objectives**

This Course introduces general biological concepts

1. It helps students to understand importance of biological concepts in engineering fields.
2. To understand application of engineering concepts in medical instrumentation.

**Learning Outcomes**

Upon successful completion of the Course, students will be able to

1. Use bioinstrumentation, required in cellular or molecular biology investigations
2. Apply the concepts of engineering in different streams of biomedical field.

**UNIT-I**

**Biomedical Signals:** Origins of Bioelectric Signals, Human body, Heart and Circulatory System, Electrodes, Transducers, ECG, EMG.

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**UNIT-II**

**Recording & Monitoring Instruments:** Recording Electrodes, Physiological Transducers, Biomedical Recorders, Biomedical Recorders, Heart rate measurement, Temperature measurement, Foetal Monitoring System, Foetal Monitoring System, Foetal Monitoring System, Foetal Monitoring System, Biomedical Telemetry.

**UNIT-III**

**Imaging System:** Working with X-Rays, CT scanner, NMR, NMR, Ultrasonic System, Ultrasonic System, Ultrasonic System.

**UNIT-IV**

**Therapeutic & Physiotherapy Equipment's:** Cardiac Pacemakers, Cardiac defibrillator, SW Diathermy & MW Diathermy.

**Patient Safety:** Electric Shock Hazards, Test Instruments, Biomedical Equipment's, Biomedical Equipment's.

**Recommended Books**

1. R.S. Khandpur, 'Handbook of Biomedical Instrumentation'.
2. Leslie Cromwell, 'Biomedical Instrumentation and Measurements', PHI.
3. T.K. Attuwood, 'Introduction to bioinformatics', Pearson Education.
4. Joseph J. Carr & John M Brown, 'Introduction to biomedical equipment Technology', Pearson Education.

**INDUSTRIAL SAFETY AND ENVIRONMENT**

**Subject Code: BMEE0 –F91**

**L T P C  
3 0 0 3**

**Duration: 38 Hrs.**

**UNIT-I**

**Meaning & Need for Safety:** Relationship of safety with plant design, equipment design and work environment. Industrial accidents, their nature, types and causes. Assessment of accident costs; prevention of accidents. Industrial hazards, Hazard identification techniques, Accident investigation, reporting and analysis.

**UNIT-II**

**Planning for Safety & its Measures:** Definition, purpose, nature, scope and procedure. Range of planning, variety of plans. Policy formulation and implementation of safety policies. Safety measures in a manufacturing organization, safety and economics, safety and productivity. Employees participation in safety. Safety standards and legislation.

**UNIT-III**

**Meaning of Environment and Need for Environmental Control:** Environmental factors in industry. Effect of temperature, Illumination, humidity noise and vibrations on human body and mind. Measurement and mitigation of physical and mental "fatigue" Basics of environment design for improved efficiency and accuracy at work. Environment Standards: Introduction to ISO 14000; Environment standards for representative industries.

**UNIT-IV**

**Ventilation and heat Control Purpose of ventilation, Lighting, Noise & Vibrations:** Physiology of heat regulation. Thermal environment and its measurement. Thermal comfort. Indices of heat stress. Thermal limits for comfort, efficiency and freedom from health risk. Natural ventilation. Mechanical ventilation. Air conditioning Process ventilation. Control of heat exposures: control at source, insulation, and local exhaust ventilation. Control of radiant heat,



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dilution ventilation. Local relief. Industrial Lighting: Purpose of lighting, benefits of good illumination. Phenomenon of lighting and safety. Lighting and the work. Sources and types of artificial lighting. Principles of good illumination. Recommended optimum standards of illumination. Design of lighting installation. Maintenance standards relating to lighting and colour. Noise & Vibrations: Continuous and impulse noise. The effect of noise on man. Noise measurement and evaluation of noise. Noise isolation. Noise absorption techniques. Silencers vibrations: Effect, measurement and control measures.

**Learning Outcomes**

1. Understand importance of safety at work
2. Understand various safety measures and how it leads to increasing plant productivity.
3. Understand basics of environmental design
4. Understand the control of Ventilation and heat etc.

**Recommended Books**

1. H.W. Heinrich, 'Industrial Accident Prevention', McGraw Hill.
2. Beranek, 'Noise Reduction', McGraw Hill.
3. D.C. Reamer, 'Modern Safety and Health Technology', R. Wiley.

**ENVIRONMENTAL POLLUTION**

**Subject Code: BCIE0-F91**

**L T P C**

**Contact Hrs. 36**

**3 0 0 3**

**UNIT -I**

**Introduction:** Environment. Pollution, Pollution control

**Air Pollution:** Air Pollutants: Types, Sources, Effects; Air Pollution Meteorology: Lapse Rate, Inversion, Plume Pattern; Air Pollution Dispersion Model: Point Source Gaussian Plume Model, Stability Classes, Stability Charts, Design of Stack Height.

**Air pollution Control:** Self cleansing properties of the environment; Dilution method; Engineered Control of Air Pollutants: Control of the particulates, Control of Gaseous Pollutants, Control of Air pollution from Automobiles.

**UNIT -II**

**Noise Pollution:** Definition; Sound Pressure, Power and Intensity; Noise Measurement, Power and Intensity, Levels, Frequency Band, Effects; Control.

**Water pollution:** Pollution Characteristics of Typical Industries, Suggested Treatments.

**UNIT -III**

**Global Environmental Issues:** Ozone Depletion, Acid Rain, Global Warming-Green House Effects.

**UNIT -IV**

**Administrative Control on Environment:** Functions of Central and State Pollution Control Boards; Environmental Clearance Process for Industries and Infrastructural Projects

**Recommended Books**

1. G. Masters, W. Ela, 'Introduction to Environmental Engineering and Science', PHI.
2. A. Sincero, G. Sincero 'Environmental Engineering: A Design Approach', PHI.
3. P.V. Rowe 'Environmental Engineering', TMH.
4. S.K. Garg, 'Environmental Engineering', Khanna Publishers.
5. Rao and Rao, 'Air Pollution', TMH.

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6. A.K. Chatterjee, 'Water Supply, Waste Disposal and Environmental Pollution Engineering', Khanna Publishers.
7. P. N. Modi, Environmental Engineering, Vol.-II.
8. Rajagopalan, 'Environmental Modelling', Oxford University Press.

**TRAFFIC ENGINEERING**

**Subject Code: BCIE0-F92**

**L T P C  
3 0 0 3**

**Contact Hrs. 36**

**Unit-I**

**Introduction:** Elements of Traffic Engineering, Components of traffic system – road users, vehicles, highways and control devices.

**Vehicle Characteristics:** IRC standards, Design speed, volume, Highway capacity and levels of service, capacity of urban and rural roads, PCU concept and its limitations.

**Unit-II**

**Traffic Stream Characteristics:** Traffic stream parameters, characteristics of interrupted and uninterrupted flows.

**Traffic Studies:** Traffic volume studies, origin destination studies, speed studies, travel time and delay studies, parking studies, accident studies.

**Unit-III**

**Traffic Regulation and Control:** Signs and markings, Traffic System Management, At-grade intersections, Channelization, Roundabouts.

**Traffic Signals:** Pre-timed and traffic actuated. Design of signal setting, phase diagrams, timing diagram, Signal co-ordination.

**Unit-IV**

**Grade Separated Intersections:** Geometric elements for divided and access controlled highways and expressways.

**Traffic Safety:** Principles and practices, Road safety audit.

**Intelligent Transportation System:** Applications in Traffic Engineering.

**Recommended Books**

1. R.M. William and P.R. Roger, 'Traffic Engineering', Prentice Hall.
2. C.J. Khisty and B.L. Kent, 'Transportation Engineering – An Introduction', Prentice Hall of India Pvt. Ltd.
3. L.R. Kadiyali, 'Traffic Engineering & Transport'.