LIST OF OPEN ELECTIVES
TO BE OFFERED IN THE EVEN SEMESTER (CEG / ACT CAMPUS)

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
Faculty of Civil Engineering								
Department of Civil Engineering								
B.E. Civil Engineering (English Medium)								
1.	CE7691	Geotechnics of Earthquake	OE	3	3	0	0	3
2.	CE7692	Optimization Techniques	OE	3	3	0	0	3
B.E. Civil Engineering (Tamil Medium)								
3.	CE7693	Construction Practices	OE	3	3	0	0	3
4.	CE7694	Basics of Traffic Management	OE	3	3	0	0	3
B.E. Geoinformatics								
5.	GI7691	Photogrammetry	OE	3	3	0	0	3
6.	GI7692	Total Station and GPS Surveying	OE	3	3	0	0	3
B. E. Agricultural and Irrigation Engineering								
7.	AI7691	Agricultural Economics and Farm Management	OE	3	3	0	0	3
8.	AI7692	Dairy Engineering	OE	3	3	0	0	3
Faculty of Electrical Engineering								
Department of Electrical and Electronics Engineering								
B.E. Electrical and Electronics Engineering								
9.	EE7691	Microprocessors and Microcontrollers	OE	3	3	0	0	3
10.	EE7692	Utilization and Conservation of Electrical Energy	OE	3	3	0	0	3
Faculty of Mechanical Engineering								
Department of Mechanical Engineering								
B.E. Mechanical Engineering and B.E. Materials Sciences and Engineering								
11.	ME7691	Basic Automobile Engineering (English & Tamil Medium)	OE	3	3	0	0	3
12.	ME7692	Energy Auditing and Conservation	OE	3	3	0	0	3
Department of Industrial Engineering								
B.E. Industrial Engineering								
13.	IE7691	performance Analysis of Automated Manufacturing Systems	OE	3	3	0	0	3
Department of Manufacturing Engineering								
B.E. Manufacturing Engineering								
14.	MF7691	Manufacturing and Testing of Automotive Components	OE	3	3	0	0	3
Department of Printing Technology								
B.E. Printing Technology								
15.	PT7691	Design for Print Media	OE	3	3	0	0	3
16.	PT7692	Introduction to Screen Printing	OE	3	3	0	0	3

Faculty of Information and Communication Engineering								
SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATEGORY**	**CONTACT PERIODS**	**L**	**T**	**P**	**C**
Department of Electronics and Communication Engineering								
B.E. Electronics and Communication Engineering								
17.	EC7691	Automotive Electronics	OE	3	3	0	0	3
18.	EC7692	Electronics Engineering	OE	3	3	0	0	3
B.E. Biomedical Engineering								
19.	BM7691	Management of Wastes in Hospitals	OE	3	3	0	0	3
20.	BM7692	Introduction to Biomaterials	OE	3	3	0	0	3
Department of Information Science and Technology								
B.Tech. Information Technology								
21.	IT7691	Database Systems	OE	3	3	0	0	3
Faculty of Technology								
Department of Leather Technology								
B.Tech. Leather Technology								
22.	LT7691	Biotechnological Application in Leather Manufacture	OE	3	3	0	0	3
Department of Textile Technology								
B.Tech. Textile Technology and B.Tech. Apparel Technology								
23.	TT7691	Garment manufacturing machinery	OE	3	3	0	0	3
24.	TT7692	Technical fibres	OE	3	3	0	0	3
Department of Ceramic Technology								
B.Tech. Ceramic Technology								
25.	CT7691	Ceramic Properties	OE	3	3	0	0	3
26.	CT7692	Ceramic Applications	OE	3	3	0	0	3
Department of Bio Technology								
B.Tech. Pharmaceutical Technology								
27.	PM7691	Introduction to drug discovery & Development	OE	3	3	0	0	3
28.	PM7692	Chemistry of Synthetic drugs	OE	3	3	0	0	3
B.Tech. Industrial Biotechnology								
29.	IB7691	Overview of biosafety	OE	3	3	0	0	3
30.	IB7692	Forensic Science	OE	3	3	0	0	3
B.Tech. Food Technology								
31.	FT7691	Emerging Techniques in food Control	OE	3	3	0	0	3
32.	FT7692	Crop Process Engineering	OE	3	3	0	0	3
Department of Chemical Engineering								
B.E. Chemical Engineering								
33.	CH7691	Drying Technology	OE	3	3	0	0	3
34.	CH7692	Fundamentals of Industrial Corrosion.	OE	3	3	0	0	3

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
Department of Applied Science and Technology								
B.Tech. Petroleum Engineering and Technology								
35.	AS7691	Lifestyle Modifications and Health in Unison	OE	3	3	0	0	3
36.	AS7692	Basics of Biochemical Technology	OE	3	3	0	0	3
FACULTY OF SCIENCE AND HUMANITIES								
DEPARTMENT OF ENGLISH								
37.	HS7691	English for Competitive Examinations	OE	3	3	0	0	3
38.	HS7692	Project and Proposal Writing	OE	3	3	0	0	3
39.	HS7693	English through Media	OE	3	3	0	0	3

CE7691 GEOTECHNICS OF EARTHQUAKE L T P C
3 0 0 3

OBJECTIVES:

- To understand the dynamics of earth and its response, effect on different earth structures and measures to mitigate the effects.

UNIT I SEISMOLOGY AND EARTHQUAKE 9

Internal structure of the Earth – Continental Draft and Plate tectonics – Faults – Elastic rebound theory – Other sources of seismic activity – Geometric notation – Location of Earthquakes – Size of Earthquake.

UNIT II BASICS OF VIBRATION 9

Introduction - Nature of dynamic loads – Vibrations of single degree freedom system- Free vibrations of spring- Mass systems – Forced vibrations – Viscous damping - Transmissibility – Principles of vibrating measuring instruments - Effect of Transient and Pulsating loads – Vibrations of multi degree freedom system.

UNIT III WAVE PROPAGATION AND DYNAMIC SOIL PROPERTIES 9

Wave in unbounded media – Waves in a semi – Infinite body – Waves in a layered body - Attenuation of stress wave – Measurement of Dynamic soil properties – Stress – Strain behavior of cyclically loaded soils –- Strength of cyclic loaded soils.

UNIT IV STRONG GROUND MOTION AND SEISMIC HAZARD ANALYSIS 9

Strong Motion measurement – Ground Motion parameters – Estimation of ground motion parameters - Spatial variability of ground motion - Identification and evaluation of earthquake sources – Deterministic Seismic Hazard Analysis - Probabilistic Seismic Hazard analysis.

UNIT V DESIGN GROUND MOTION 9

One dimensional ground response analysis – Two and three dimensional analysis – Effect of local site condition on ground motion – Design parameters – Development of design parameters – Development ground motion time histories – Application of software package – Codal recommendations .

TOTAL: 45 PERIODS

OUTCOME:

- Students are able to develop the design ground motion for an area based on bed rock motion and types of soils, so that the effects of earthquakes can be mitigated.

REFERENCES:

1. Kameswara Rao, N.S.V., Dynamics soil tests and applications, Wheeler Publishing - New Delhi, 2000.
2. Krammer S.L., Geotechnical Earthquake Engineering, Prentice Hall, international Series, Pearson Education (Singapore) Pvt. Ltd., 2004.
3. Kameswara Rao, Vibration Analysis and Foundation Dynamics, Wheeler Publishing, New Delhi, 1998.
4. Wai-Fah Chen and Cgharles Scawthem, Earthquake Engineering Hand book, Caspress, 2003.
5. Robert W. Day, Geotechnical Earthquake Engineering Hand book, Second Edition, McGraw Hill, 2012.
6. Ikuo Towhata, “Geotechnical Earthquake Engineering” Springer series in Geomechanics and Geoengineering, Scientific Publishing services Pvt. Ltd., 2008.
7. Swami Saran, "Soil Dynamics and Machine Foundation, Galgottia Publications Pvt. Ltd., New Delhi-110002, 1999

CE7692 OPTIMIZATION TECHNIQUES L T P C
3 0 0 3

OBJECTIVES

- This course gives an opportunity for the students to know the various optimization techniques which can be adopted in design, construction and maintenance of any engineering system. Linear Programming, Non Linear Programming, Dynamic Programming techniques are explained in detail. Advanced optimization techniques such as Genetic algorithm, Evolutionary search algorithm, Simulated Annealing and Ant Colony Optimization are briefly introduced.

UNIT I INTRODUCTION 9

Activity- Design methodology - Mathematical models -Design Variables, Objective Function, Unconstrained functions – Single variable – Several variables – Equality Constraints - Inequality constraints - Problem Formulation – Generalized Newton Raphson method

UNIT II LINEAR PROGRAMMING (LP) 9

Introduction to LP and formulation of Linear Programming problems, Graphical solution method, alternative or multiple optimal solutions, Unbounded solutions, Infeasible solutions, Maximization – Simplex Algorithm, Minimization – Simplex Algorithm using Big-M method, Two phase method, Duality in linear programming, Transportation & Assignment Problems, Integer linear programming.

UNIT III NONLINEAR PROGRAMMING 9

Optimality criteria – unconstrained function of single variables –several variables- Unidirectional search - Direct search methods – pattern search method - constrained function of single variable – several variables – Gradient Based Methods.

UNIT IV DYNAMIC PROGRAMMING AND NETWORK ANALYSIS 9

Pipeline network problem –solution of network – optimality – allocation process -probability in PERT analysis, project time cost trade off, introduction to resource smoothing and allocation – optimization by dynamic programming – simulation methods.

UNIT V NON-TRADITIONAL METHODS 9

Simulated Annealing – Algorithm- Boltzmann's equation – stability – Genetic Algorithm and Evolutionary Strategy –Choice of population – genetic operators- survival of the fittest – two bar pendulum – generation – Ant Colony Optimization –probability – finding the short path – pheromone trail.

TOTAL: 45 PERIODS

OUTCOMES:

- Upon completion of the course, the student will be able to understand importance of optimization of industrial process management, apply basic concepts of mathematics to formulate an optimization problem analyze and appreciate variety of performance measures for various optimization problems.

TEXT BOOK:

1. Rao, S.S: "Engineering Optimization: Theory and Practice", John Wiley & Sons,Inc, 2009.
2. Taha, H.A,"Operations Research: An Introduction, Pearson,2013.
3. N D Vohra, Quantitative Techniques in management, Tata McGraw Hill, 2006.

REFERENCES:

1. Goldberg, D.E, "Genetic Algorithms in search, Optimization and Machine Learning", Eddison and Wesley, 1989.
2. Dorigo, M and Stutzle, T," Ant Colony Optimization", MIT Press, Cambridge, 2004.
3. Deb, K, Optimization for Engineering Design, Prentice Hall of India.2012.
4. Ravindran, A , Ragsdell, K.M, Reklaitis, G.V, "Engineering Optimization: Methods and Applications", Wiley, New York,2006.
5. Hadley, G,"Linear programming", Narosa Publishing House, New Delhi, 1992.

CE7693 **CONSTRUCTION PRACTICES** **L T P C**
3 0 0 3

OBJECTIVE:

- To introduce students about the basic construction practices such as construction materials, metals, construction methods, modern materials and service requirements commonly used in buildings.

UNIT I CONSTRUCTION MATERIALS **9**

Stone as building material - Criteria for selection - Bricks - Classification - Bricks for special use - Cement - Ingredients - Types and Grades - Aggregates - Light weight concrete blocks - Concrete – Ingredients - Other types of Concrete - Durability of Concrete.

UNIT II METALS **9**

Steel and Cast Iron- Composition - Market forms - Aluminum and its alloys - Composition - Aluminium composite panel - Uses - Market forms - Copper and its alloys - Zinc and other metals.

UNIT III CONSTRUCTION TECHNIQUES **9**

Types of Foundations - Stones masonry - Brick masonry - Composite masonry - Cavity walls - Formwork - Shoring – Scaffolding - Selection of construction equipment for various works.

UNIT IV MODERN MATERIALS **9**

Glass - Ceramics - Fibre glass reinforced plastic - Fibre textiles - Composite materials - Geomembranes and Geotextiles for earth reinforcement - floor finish materials for residential/industrial buildings

UNIT V SERVICE REQUIREMENTS **9**

Painting, Distempering and white washing - Fire Protection - Thermal insulation - Ventilation and air conditioning - Acoustics and Sound insulation - Damp proofing - Termite proofing.

TOTAL: 45 PERIODS

OUTCOMES:

- Students completing the course will have understanding about the basic building materials and different construction techniques and practices. They will be able to plan the requirements of any construction project.

TEXTBOOKS:

1. Varghese.P.C, Building Materials, Second Edition, Prentice Hall Inc., 2015.
2. Dr.S.K.Sharma, Building Construction, S. Chand and Company Ltd., 2014.
3. P.Purushothama Raj, Building Construction Materials and Techniques, Pearson India Education Ltd. 2016.
4. Santhakumar.A.R., Concrete Technology, Oxford University Press ,India, 2006

REFERENCES:

1. Rajput.R.K., Engineering Materials, Fifth Edition, S. Chand and Company Ltd., 2014.
2. Shetty.M.S., Concrete Technology (Theory and Practice), S. Chand and Company Ltd., 2013.
3. Varghese.P.C., Building Constructions, PHI Learning Private Limited, 2007
4. Punmia, B.C., Building Construction, Laxmi Publications (P) Ltd., 2016
5. Peurifoy, R.L, Schexnayder,C.J., Shapira,A., Schmitt. R., Construction Planning, Equipment and Methods, Tata McGraw-Hill, 2010.

CE7694 BASICS OF TRAFFIC MANAGEMENT L T P C
3 0 0 3

OBJECTIVE

- To understand the basics of traffic engineering, planning, operation and its latest development.

UNIT I TRAFFIC CHARACTERISTICS 9

Classification of Urban and Rural roads- overall view of road geometric elements -Characteristics of Road user, Vehicle, Environment – traffic parameters-Fundamental diagram of traffic flow-Traffic Ethics

UNIT II TRAFFIC MANAGEMENT 9

Traffic signs and Markings -Priority rules - One way street system, exclusive traffic lanes, tidal flow operation,Transport System Management (TSM) and Transport Demand Management (TDM)- Traffic Impact Assessment

UNIT III ROAD ACCIDENTS 9

Road accidents statistics and scenarios- cause, effect, prevention and cost- accident data collection- Road safety audit and Its importance –case study

UNIT IV DRIVER TRAINING 9

Role of Drivers in safe driving -Driver training methods - Driving Simulator- Re-training for accident prone drivers- Introduction to Motor Vehicle Act- Amendments

UNIT V INTELLIGENT TRANSPORTATION SYSTEM 9

Introduction to ITS- Advanced Traveler Information system- - Electronic toll collection- Case study

TOTAL: 45 PEIRODS

TEXT BOOK:

1. Kadiyali. L.R. Traffic Engineering and Transport Planning, Khanna Publishers, Delhi,2008.
2. Khanna .K and Justo C.E.G. and Veeraragavan, A Highway Engineering, Nem Chand Bros., Roorkee, Revised 10th Edition, 2014.

REFERENCES:

1. Roger P.Roess, William R.Mcshane and Elena S.Prassas, Traffic Engineering-Second Edition, Prentice Hall Publishers,, Upper Saddle River, New Jersey 1998
2. Robert Gordon, “Intelligent Transport Systems” Springer ,USA

GI7691 PHOTOGRAMMETRY L T P C
3 0 0 3

OBJECTIVE:

- To introduce basics and concepts of aerial photography, acquisition and mapping from aerial photographs using different types of stereo plotters

UNIT I INTRODUCTION 9

Principles - Stereoscopic depth perception – aerial photo-aerial camera -Scale – overlaps – stereoscopy – concepts – viewing and measuring system – principle of floating mark – methods of parallax measurement – vertical photographs – geometry, scale, parallax equations, planimetric mapping – Tilted photograph – Geometry, Coordinate system, Scale, Planimetric mapping

UNIT II TRANSFORAMTIONS 9

Coordinate systems for Photogrammetry - Map projections, Datum and conversions- 2D Coordinate transformations-Collinearity and Space resection-Analytical stereomodel and relative orientation- Three dimensional Coordinate transformations

UNIT III MAPPING 9

Concepts of interior, relative, absolute orientation – direct georeferencing – object, image relation - collinearity and coplanarity conditions – effect of orientation elements - Elements and principles of Aerotriangulation – Independent Models-Simultaneous bundle adjustment - ortho mosaic

UNIT IV DIGITAL IMAGE HANDLING 9

Digital cameras- CCD camera- full frame, frame transfer, interline CCD camera - Time delay integration- spectral sensitivity of CCD sensor – geometry and radiometry problem of CCD image - Image Generation - Data Compression - formats – Georeferencing - Stereo viewing - Display modes - image matching techniques - Image measurements.

UNIT V APPLICATIONS 9

Review of space resection & intersection - Automatic tie point generation - Automatic Block triangulation, feature collection and plotting–DEM Generation - accuracy of DEMs, Orthorectification - regular & irregular data collection methods - contour generation - watershed delineation - Satellite Photogrammetry principles – missions - stereo image products.

TOTAL: 45 PERIODS

OUTCOMES:

On completion of this course, the student shall

- Acquire knowledge about photogrammetry principles, methods and products generation strategies in both Analytical and digital photogrammetry system.
- Understand the problem related to generation of products and solving them.

REFERENCES:

1. Paul R.Wolf, Elements of Photogrammetry, McGraw-Hill Science, 2001, ISBN 0070713464, 9780070713468
2. Karl Kraus, Photogrammetry, Fundamentals and standard processes, Dümmler, 2000, ISBN 978 3 11019007 6
3. Micheal Kasser and Yves Egels, “Digital Photogrammetry”, Taylor and Francis, 2002, ISBN 0 748 40944 0
4. Francis h. Moffitt, Edward M. Mikhail, Photogrammetry, TBS The Book Service Ltd, 1968, ISBN 13: 9780700221370
5. Edward M. Mikhail, James S.Bethel, J.Chris McGlone, Introduction on “Modern Photogrammetry”, John Wiley & Sons, Inc., 2001, ISBN 0-471-30924-9
6. Wilfried Linder, “Digital Photogrammetry”-Theory and Applications, Springer-Verlag Berlin Heidelberg New York, 2003, ISBN 3-540-00810-1

GI7692 TOTAL STATION AND GPS SURVEYING L T P C
3 0 0 3

OBJECTIVES :

- To understand the working of Total Station and GPS equipment and solve the surveying problems.

UNIT I FUNDAMENTALS 9

Methods of Measuring Distance, Basic Principles of Total Station, Historical Development, Classifications, applications and comparison with conventional surveying. Global Navigation System, Regional Navigation System and SBAS - Basic concepts of GNSS, Glonass,IRNSS - Historical perspective and development - applications - Geoid and Ellipsoid- satellite orbital motion - Keplerian motion – Kepler‟s Law - Perturbing forces - Geodetic satellite - Doppler effect- Different Coordinate and Time System.

UNIT II ELECTROMAGNETIC WAVES 9

Classification - applications of Electromagnetic waves, Propagation properties, wave propagation at lower and higher frequencies- Refractive index (RI) - factors affecting RI-Computation of group for light and near infrared waves at standard and ambient conditions-Computation of RI for microwaves at ambient condition - Reference refractive index- Real time application of first velocity correction. Measurement of atmospheric parameters- Mean refractive index- Second velocity correction -Total atmospheric correction- Use of temperature - pressure transducers.

UNIT III ELECTRO OPTICAL AND MICRO WAVE SYSTEM 9

Electro-optical system: Measuring principle, Working principle, Sources of Error, Infrared and Laser Total Station instruments. Microwave system: Measuring principle, working principle, Sources of Error, Microwave Total Station instruments. Comparison between Electro-optical and Microwave system. Care and maintenance of Total Station instruments– Applications of COGO functions -Traversing and Trilateration – Downloading and mapping - Recent trends.

UNIT IV GPS SATELLITE SYSTEM 9

GPS - Different segments - space, control and user segments - satellite configuration - GPS signal structure - Orbit determination and representation - Anti Spoofing and Selective Availability - Task of control segment - GPS receivers.

UNIT V GPS DATA PROCESSING 9

GPS observables - code and carrier phase observation - linear combination and derived observables - concept of parameter estimation – downloading the data -data processing – software modules -solutions of cycle slips, ambiguities, RINEX format. Concepts of rapid, static methods with GPS - semi Kinematic, pure Kinematic and Real time kinematic methods -basic constellation of satellite geometry & accuracy measures - applications- use of different softwares.

TOTAL : 45 PERIODS

OUTCOMES:

On completion of this course students shall be able to

- Understanding the concepts of Electromagnetic waves and impact of Refractive Index.
- Work with Electro optical and microwave Total Station and understand error sources**.**
- Understand the advantages of electronic surveying over conventional surveying methods
- Understand the working principle of GNSS , it‟s components, signal structure, and error sources
- Understand various GNSS surveying methods and processing techniques used in GNSS observations
- Familiarise various areas of GNSS applications and new developments.

REFERENCES:

1. Rueger, J.M. Electronic Distance Measurement, Springer-Verlag, Berlin, 4th edition, 1996
2. Satheesh Gopi, rasathishkumar, N.madhu, " Advanced Surveying, Total Station GPS and Remote Sensing " Pearson education , 2007 isbn: 978-81317 00679
3. Laurila, S.H. Electronic Surveying in Practice, John Wiley and Sons Inc, 1993.
4. Guocheng Xu, GPS Theory, Algorithms and Applications, Springer - Verlag, Berlin, 2003.
5. Alfred Leick, GPS satellite surveying, John Wiley & Sons Inc., 3rd Edition, 2004.
6. Seeber G, Satellite Geodesy, Walter De Gruyter, Berlin, 1998

AI7691 AGRICULTURAL ECONOMICS AND FARM MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge

- In Farm Management, and Basic Concept of Farm Management. Product Relationship and Law of diminishing return
- Type of resource and Investment analysis in agriculture sector
- Farm financial analysis, Investment and Budgeting for farms

UNIT I INTRODUCTION & SCOPE OF FARM MANAGEMENT 9

Farm Management - definition and scope - relationship between farm management and other sciences - Characteristics and significance. Farm management decision making process. Basic concepts in farm management. Factor and Farm layout - Farm records and Accounts - Farm Appraisal Techniques. Valuation and Depreciation – Factor

UNIT II LAWS OF ECONOMICS 9

Product relationship - Production function - definition & types - Impact of technology. Law of diminishing returns. Equi-marginal returns and Opportunity cost comparative advantage. Cost concepts & interrelations. Optimum level of input use and optimum 39 production. - Economies of scale external and internal economies and diseconomies. Returns to scale - Economies of size. Factor - Factor relationship.

UNIT III COST CURVES 9

Principle of substitution - isoquant, isocline. Expansion path, ridge line and least cost combination of inputs. Product - Product relationship. Types of products. Production possibility curve, iso revenue line and optimum combination of outputs - Concepts of Risk and uncertainty – Product relationship - Cost curves, optimum input and output levels - Factor - Factor relationship least cost combination of inputs - Product - Product relationship - Preparation of Interview schedule and visit to a farm for data collection - Estimation of cost of cultivation and cost of production of annual and perennial crops.

UNIT IV MANAGEMENT OF RESOURCES 9

Types of uncertainty in agriculture - Managerial decisions to reduce risks in production process. Management of resources - Types of resources - land, labour, capital, and measurement of their efficiencies - mobilization of farm resources. Cost of maintenance of machinery and break even analysis - Estimation of cost of production. Dairy and poultry products - Investment analysis. Undiscounted and Discounted methods.

UNIT V FINANCIAL ANALYSIS 9

Farm Financial Analysis. Balance sheet - Income statement - Cash flow analysis - Ratio analysis. Farm Investment Analysis - Time comparison principles - Discounted and undiscounted measures. Farm planning and control - Elements of planning - Farm level management information systems- Farm Budgeting partial, enterprise and complete budgeting. Preparation of Balance sheet and income statement - Preparation of cash flow statement and ratio analysis - Estimation of 3Rs of credit - Preparation of Farm plan Enterprise budgeting - Partial budgeting and complete budgeting.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Johl, S.S., and Kapur, T.R., “Fundamentals of Farm Business Management”, Kalyani Publishers, Ludhiana, 2001.
2. Muniraj, R., “Farm Finance for Development”, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 2000.

REFERENCES:
1. Raju, V.T., “Essentials of Farm Management”, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 2002.
2. Sankhayan, P.L., “Introduction to Farm Management”, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2001.
3. Subba Reddy, S., and Raghu Ram, P., “Agricultural Finance and Management”, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 1996.

AI7692 DAIRY ENGINEERING L T P C
3 0 0 3

OBJECTIVES:
At the end of the course the students would be exposed to fundamental knowledge in
- Properties of Milk
- Processing of Milk and Manufacture of dairy products
- Sanitation and effluent treatment in dairy industry

UNIT I PROPERTIES OF MILK 7
Milk-Types-Composition-Physical-Chemical and Thermal Properties-Heat Capacity Density-Freezing-Boiling point-Expansion-Agitation-Viscosity-Classification of milk Market and Special Milk Handling-effects of Merits on Milk-toxicity of metals.

UNIT II PROCESSING OF MILK 8
Processing of Milk-Staining-Filtering and Clarification of Milk-cream separation Pasteurization.-Homogenization-Methods and Equipments-Emulsification-Fortification

UNIT III DAIRY PRODUCTS 10
Manufacture of dairy products-Butter properties-Process involved in Manufacture of butter-Market Grades of butter-Manufacturing of Cheese-Classification-Composition Methods and Equipment-Ghee Processing-Methods and Equipments-Processing of ice cream-Classification-Composition-Methods and Equipments.

UNIT IV MILK POWDER PROCESSING 8
Condensed Milk-Composition-Properties-Methods and Equipments-Processing of Milk Powder-Properties-Composition-Types-Manufacture of Milk Powder. Drum and Spray driers-Types of atomizers and flow patterns-droplet trajectory of milk.

UNIT V SANITATION AND EFFLUENT TREATMENT 12
Processing of Milk Products-Skim milk-Butter milk-Flavoured Milk, whey, casein, yoghurt and panner. Packaging of Milk and Milk Products-Fillers-Cippers-pouch fillers Transporation of Milk-Flexible paucher Milk-Storage Tanks-Storage of icecream etc. in freezers-Cleaning and Sanitation -Importance - Detergents - Properties - Cleaning procedures-Cleaning in place-Sanitation-Dairy effluent treatment and disposal.

TOTAL: 45 PERIODS

TEXT BOOKS:
1. Ananthakrishnan, C.P., and Sinha, N.N., “Technology and Engineering of Dairy Plant Operations, Laxmi Publications, New Delhi. Pp.319, 1984.
2. Warner, J.N., “Principles of Dairy Processing”, Wiley Eastern Pub. Co., New York, 1975.

REFERENCE:
1. Tufail Ahmed., “Dairy Plant Engineering and Management”, Kitab Mahal Publishers, Allahabad, 1997.

EE7691 MICROPROCESSORS AND MICRO CONTROLLERS L T P C
3 0 0 3

AIM

To introduce Microprocessor Intel 8085, 8086 and the Micro Controller 8051

OBJECTIVES

- To study the Architecture of 8085, 8086 & 8051.
- To study the addressing modes & instruction set of 8085, 8086 & 8051.
- To introduce the need & use of Interrupt structure.
- To develop skill in simple program writing.
- To introduce commonly used peripheral/ interfacing ICs

UNIT I 8085 PROCESSOR 9

8085:Functional block diagram - Signals– Memory interfacing – I/O ports and data transfer concepts – Timing Diagram – Interrupt structure, 8086 Architecture.

UNIT II PROGRAMMING OF 8085 PROCESSOR 9

Instruction format and addressing modes – Assembly language format – Data transfer, data manipulation & control instructions – Programming: Loop structure with counting & Indexing - Look up table - Subroutine instructions stack. 16

UNIT III PERIPHERAL INTERFACING 9

Study of Architecture and programming of ICs: 8255 PPI, 8259 PIC, 8251 USART, 8279 Key board display controller and 8253 Timer/ Counter – Interfacing with 8085 - A/D and D/A converter interfacing.

UNIT IV MICRO CONTROLLER 8051 9

Functional block diagram - Instruction format and addressing modes – Interrupt structure – Timer –I/O ports – Serial communication, Simple programming.

UNIT V MICRO CONTROLLER PROGRAMMING & APPLICATIONS 9

Data Transfer, Manipulation, Control & I/O instructions – Simple programming exercises key board and display interface – Closed loop control of DC shunt motor- stepper motor control.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. R.S. Gaonkar, 'Microprocessor Architecture Programming and Application', Wiley Eastern Ltd., New Delhi,
2. Muhammad Ali Mazidi & Janice Gilli Mazidi, 'The 8051 Micro Controller and Embedded Systems', Pearson Education, 2007.

REFERENCES:

1. Antonakos, 'The Pentium microprocessor', Pearson Education, 2007
2. Kenneth Ayala, 'The 8051Microcontroller', Thomson, 2005
3. N.K De and P.K Sen, 'Electric Drives', Prentice Hall of India, 2005

EE7692 UTILIZATION AND CONSERVATION OF ELECTRICAL ENRGY L T P C
3 0 0 3

UNIT I ELECTRIC DRIVES AND TRACTION 9

Fundamentals of Electric drive – choice of an Electric Motor – Application of motors for particular services. Traction Motors – Characteristic features of Traction motor – Systems of railway electrification – Electric Braking – Train movement and energy consumption – Traction Motor control – Track equipment and collection gear.

UNIT II ILLUMINATION 9

\Introduction – Definition and meaning of terms used in illumination Engineering – Classification of light sources. Incandescent lamps, sodium vapour lamps, mercury vapour lamps, fluorescent lamps – Design of illumination systems – Indoor lighting schemes – factory lighting halls – outdoor lighting schemes – flood lighting – street lighting – Energy saving lamps.

UNIT III HEATING AND WELDING 9

Introduction – advantages of Electric heating – Modes of heat transfer – Methods of electric heating – Resistance heating – Arc furnaces – Induction heating – Dielectric heating. Electric welding – Types – Resistance welding – Arc welding – Radiation welding – Requirements of good weld – Preparation of work – Electrodes – Power supply for arc welding.

UNIT IV REFRIGERATION AND AIR CONDITIONING 9

Introduction – Refrigeration cycle – Refrigeration system – Types of refrigerants – Domestic refrigerator – Water coolers – Air conditioning systems – Air conditioning cycle – Classification of air conditioning systems – Central system – Unitary systems – Load estimation – Heating of building.

UNIT V ECONOMICS OF ELECTRICAL ENERGY UTILIZATION 9

Economics of Electric power supply – General rule for charging the energy – Economical cross section of a conductor – Ratings of a motor – temperature rise in a motor – power factor improvement – methods of reducing power factor occurrence – Economic choice of equipment – energy management – energy auditing – power quality – effect on conservation.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Dr.N.V.Suryanarayana, Utilisation of Electric power, Wiley Eastern Limited, New Age International Limited, 1993.
2. J.B.Gupta, Utilisation Electric power and Electric Traction, S.K.Kataria and Sons, 2000.

REFERENCES:

1. R.K.Rajput, Utilisation of Electrical Power, Laxmi publications (P) Ltd., 2007
2. H.Partab, Art and Science of Utilisation of Electrical Energy", Dhanpat Rai and Co., New Delhi – 2004.
3. C.L.Wadhwa, "Generation, Distribution and Utilisation of Electrical Energy", New Age International Pvt. Ltd., 2003.

ME7691 **BASIC AUTOMOBILE ENGINEERING** **L T P C**
(English & Tamil Medium) **3 0 0 3**

AIM

- To impart knowledge on basic and advanced concepts of Automobile Engineering.

UNIT I INTRODUCTON 9

Types of automobiles, vehicle construction and different layouts, chassis, frame and body, resistance to vehicle motion, Specifications, Performance Parameters.

UNIT II POWER SOURCES 12

Reciprocating Engine systems - classification, SI and CI engines - materials, construction and principle of operation, Performance and emission characteristics. Pollutants - Sources of Carbon Monoxide, unburnt hydrocarbon, Oxides of Nitrogen, Smoke and particulate matter. Control methods - Three way catalyst, Diesel particulate filter and Exhaust gas recirculation technique. Port and direct gasoline injection systems for SI engines, Electronic ignition systems common rail direct injection system, hybrid and electric vehicles

UNIT III TRANSMISSION SYSTEMS 9

Clutch-types and construction, gear boxes, manual and automatic, propeller shaft, slip joints, universal joints, Differential, and rear axle.

UNIT IV STEERING, BRAKES AND SUSPENSION SYSTEMS 9

Types of steering gear box-Power Steering. Pneumatic and Hydraulic Braking Systems, Suspension Systems, Antilock Braking System, Cruise control system, and Heating, ventilation and Air-conditioning system.

UNIT V SAFETY AND COMFORT SYSTEMS 6

Engine Cooling system, Airbag System, Reverse parking system, Anti-collision system, Traction control system, cruise control system, driverless cars.

. **TOTAL:45 PERIODS**

OUTCOME:

- On completion of the course, the students will be able to apply their knowledge in the design of automobile systems.

TEXT BOOK:

1. William H. Crouse and Donald L. Anglin, “Automotive Mechanics”, Tata McGraw Hill, 2004, Tenth Edition.

REFERENCES:

1. Ganesan V, "Internal Combustion Engines", Tata McGraw Hill Book Co., 2003.
2. Robert Bosch , "Diesel Engine Management", Newness Publications, 2005.
3. Robert Bosch, "Gasoline Engine Management", Bentley Publications, 2004.
4. Eric Chowanietz "Automobile Electronics" SAE Publications, 1995.
5. Bosch “Automotive Handbook”, Robert Bosch GmbH, Germany, 2004, Sixth Edition.

ME7692 **ENERGY AUDITING AND CONSERVATION** **L T P C**
3 0 0 3

OBJECTIVES:

- To understand the various methods of energy auditing and management.
- To understand the various conservation opportunities of utilities.

UNIT I INTRODUCTION **9**

Types & Forms of Energy - Primary / Secondary Energy Sources –EC Act 2003 - Energy Auditing: Types, classifications, deliverables, barriers – Benchmarking - Roles & Responsibility of Energy Managers – Basic Instruments for Energy Auditing.

UNIT II ENERGY COSTING AND ECONOMICS **9**

Data & Information Analysis – Energy Accounting and Balancing - Energy Economics – Depreciation - Financial Analysis Techniques – Discount Rate, Payback Period, Internal Rate of Return, Net Present Value, Life Cycle Costing – ESCO concept – CUSUM Technique – ESCO Concept – ESCO Contracts.

UNIT III ELECTRICAL SYSTEMS **9**

TANGEDCO Billing – HT and LT supply - Transformers - Efficiency - Power Factor - Harmonics, Electric Motors - Motor Efficiency Computation, Energy Efficient Motors, Illumination – Lux, Lumens, Types of lighting, Efficacy, LED Lighting and scope of Encon in Illumination.

UNIT IV THERMAL SYSTEMS **9**

Stoichiometry, Combustion principles, Boilers, Furnaces and Thermic Fluid Heaters – Efficiency Computation and Encon Measures - Steam Traps - Cogeneration - Waste heat recovery devices.

UNIT V ENERGY CONSERVATION IN MAJOR UTILITIES **9**

Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems - Cooling Towers – D.G. sets.

TEXT BOOK:

1. Energy Manager Training Manual (4 Volumes) available at https://beeindia.gov.in/content/energy-auditors, a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India, 2017.
2. Barney L. Capehart, Wayne C. Turner, and William J. Kennedy, Guide to Energy Management, Fifth Edition, The Fairmont Press, Inc., 2006

REFERENCES:

1. L.C. Witte, P.S. Schmidt, D.R. Brown, “Industrial Energy Management and Utilisation” Hemisphere Publ, Washington, 1988.
2. Callaghn, P.W. “Design and Management for Energy Conservation”, Pergamon Press, Oxford,1981.
3. I.G.C. Dryden, “The Efficient Use of Energy” Butterworths, London, 1982
4. W.C. turner, “Energy Management Hand book” Wiley, New York, 1982
5. W.R. Murphy and G. McKay “Energy Management” Butterworths, London 1987
6. Ursala Eicker, “Solar Technologies for buildings”, Wiley publications, 2003
7. Eastop T.D & Croft D.R, Energy Efficiency for Engineers and Technologists,. Logman Scientific & Technical, ISBN-0-582-03184, 1990.

IE7691 PERFORMANCE ANALYSIS OF AUTOMATED MANUFACTURING SYSTEMS **L T P C**
3 0 0 3

OBJECTIVES:

Train the students

- To classify and identify suitable performance measures for manufacturing systems.
- To model and analyse manufacturing systems in discrete time space
- To model and analyse manufacturing systems in continuous time space
- To identify the suitable performance measures in queuing problems in manufacturing systems
- To model the manufacturing systems using Petri net Models

UNIT I INTRODUCTION TO AUTOMATED MANUFACTURING SYSTEMS 9

Introduction, Types of Manufacturing Systems, Principles of Manufacturing Systems, Performance Measures, Types and uses of Manufacturing Models, Steps in Model Building.

UNIT II DISCRETE TIME MARKOV CHAINS 9

Characteristics of Markov Chain, Applications of Markov analysis, State and Transition Probabilities, Multi-period Transition Probabilities, Steady State Conditions. Definition and Notation, Sojourn Times in DTMC, Chapman-Kolmogrov Equation, Performance analysis of Manufacturing Cases in DTMC.

UNIT III CONTINUOUS TIME MARKOV CHAINS 9

Definition and Notation, Sojourn Times in CTMC, Steady State Analysis, Rate Balance Equations, Performance analysis of Manufacturing Cases in CTMC

UNIT IV QUEUING MODELS 9

Queues- Notations, Performance Measures, Open Queuing Networks- Tandem Queues, Jacksons Network, Closed Queuing Networks- Closed transfer line, Gordon-Newell Networks.

UNIT V PETRI NET MODELS 9

Classical Petri nets- Transition, firing and reachability, Representational powers, properties. Exponential Timed Petri Nets

Total: 45 Periods

OUTCOMES

CO1: Ability to classify the type of manufacturing system and identify suitable performance Measure.
CO2: Ability to Model and analyse a manufacturing system using DTMC
CO3: Ability to Model and analyse a manufacturing system using CTMC
CO4: Ability to Analyse Queuing Performance Measures for a manufacturing System.
CO5: Ability to model the manufacturing systems using Petri Net Models

TEXT BOOK

1. Viswanadham and Narahari, “Performance modeling of automated manufacturing systems”, PHI, 2005

REFERENCES:

1. Ronald G Askin, “Modeling and Analysis of Manufacturing systems”, Wiley & sons,1993.
2. Buzacot and Shantikumar, “Queueing networks in Manufacturing”, Wiley Sons, 2000.
3. Reisig W, “System Design Using Petrinets”, Springer, 2000.

MF7691 MANUFACTURING AND TESTING OF AUTOMOTIVE COMPONENTS L T P C
3 0 0 3

AIM

- To provide a comprehensive module on the aspects of materials, manufacture and testing of automotive components and subsystems.

OBJECTIVE

- To equip the learners with necessary domain inputs such that they can pursue research, consultancy, academics or other avocation.

UNIT I SELECTION OF AUTOMOTIVE MATERIALS 9

Selection of automotive materials – types of materials – Ferrous – Carbon and Low Alloy steels, High Alloy Steels, Cast Irons– Nonferrous – Aluminium, Magnesium, Titanium, Copper and Nickel alloys, composites – Production methods – Casting, Forging, Powder Metallurgy –Machining.

UNIT II AUTOMOTIVE ENGINE SYSTEM 9

Manufacturing of Cylinder Block, Cylinder Head, Crankcase and Manifolds, Piston Assembly, Connecting Rod, Crankshaft, Camshaft and Valve Train - Carburettors, fuel injection system - Testing Methodologies.

UNIT III AUTOMOTIVE AUXILIARY SYSTEM - I 9

Manufacturing of Fuel pumps , radiators, ignition , intake and exhaust systems—Gear Box , clutch system –steering system – braking system - Testing Methodologies

UNIT IV AUTOMOTIVE AUXILIARY SYSTEM - II 9

Manufacturing of propeller shaft, gear box housing, shock absorbers – wheel housing –Brake shoes, leaf spring, wheel disc, wheel rim – Testing methodologies - usage of non metallic materials for chassis components.

UNIT V COMPUTER INTEGRATED MANUFACTURING AND TESTING 9

Integration of CAD, CAM and CIM- Networking, CNC programming for machining of Engine Components. TS 16949, ISO and BIS codes for testing. Instrumentation, computer aided engine testing, metrology for manufacture of automotive components.

TOTAL : 45 PERIODS

REFERENCES

1. Richard D. Atkins, An Introduction to Engine Testing and Development, SAE International, USA,2009.
2. Bosch Automotive Handbook, (8th Edition), Robert Bosch GmbH, Germany, 2011.
3. H.N. Gupta, Fundamentals of Internal Combustion Engines, PHI Learning Private Ltd., 2010.
4. James D. Halderman and Chase D. Mitchell Jr. , Automotive Engines: Theory and Servicing, Pearson Education Inc., 2005.
5. Christopher Hadfield, Automotive Engineering : Engine Repair and Rebuilding, Delmar Learning (Cengage Learning India Private Ltd.), 2010.
6. Judge, A.W., Testing of high speed internal combustion engines, Chapman & Hall., 1960.
7. Heldt, P.M., High speed Internal Combustion Engines, Oxford & IBH Publishing Co., 1960.
8. P. Radhakrishnan and S. Subramaniyan, CAD / CAM/CIM, New Age International (P) Ltd,Publishers, 1997.
9. Richard W. Heine, Carl R. Loper Jr. and Philip, C., Rosenthal, Principles of Metal Casting,McGraw-Hill Book Co., 1980.

PT7691 **DESIGN FOR PRINT MEDIA** **LT P C**
3 0 0 3

OBJECTIVES

The students should be made to:

- Learn the basics of graphic design for printing.
- Be familiar with various printing processes and stages in printing workflow.

UNIT I PRINCIPLES OF DESIGN 9

Basic concepts of designing; Visual ingredients of graphic design; Design consideration; Layout – purpose & advantages; layout styles; layout components; stages in preparing a layout; marking-up; Software used; Dummy, Case studies.

UNIT II DESIGNING FOR PRINT PRODUCTS 9

Designing for Booklets, Magazines, Business publications, Banners & Posters, Advertising; Case studies; Print buying - Specifications, cost estimation.

UNIT III PREPRESS 9

Additive and Subtractive colour theory; Continuous and half-tone; Originals - text, image, graphics; File formats and software; File submission requirements; Stages in prepress.

UNIT IV PRINTING PROCESSES 9

Types of process – Letterpress, Offset, Gravure, Flexography, Screen printing, Digital Printing Processes; Selection criteria; Applications.

UNIT V PRINT FINISHING 9

Standard Paper sizes; Standard sizes of printed products; Types of finishing process - coating, cutting, folding, binding, hot foil stamping, die-cutting, embossing, pouching; Selection criteria; Applications.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the student should be able to:

- Create layouts and designs for various print products.
- Select suitable printing and finishing process for a given product.

TEXT BOOKS:

1. David A. Lauer, Stephen Pentak, “Design Basics”, 6th Edition, Wadsworth, 2005
2. Helmut Kipphan, “Handbook of Print Media”, Springer, Heidelberg, 2000

REFERENCES:

1. Pamela Mortimer, “Document Design Primer”, GATF, 2003
2. Poppy Evans and Mark A. Thomas, ‘ Exploring the Elements of Design”, Delmar Publishers, 2004
3. Robin McAllister, “Design for Production”, Delmar Publishers, 1997.

PT7692 INTRODUCTION TO SCREEN PRINTING L T P C
3 0 0 3

OBJECTIVES

The students should be made to:

- Learn the principle of screen printing and its applications.
- Gain knowledge on types of machines

UNIT I INTRODUCTION 9

Principle; Components – Stencil, fabric, frame, Squeegee, Ink and substrate; Fabric – Terminology, Selection; Squeegee – Components, Selection; Printing factors; Aspects affecting screen printing quality.

UNIT II STENCIL SYSTEMS 9

Fabric preparation; Handmade stencils – Hand painted stencils, Knife-cut stencils; Photomechanically made stencils – Indirect photostencils, Direct emulsion photostencils, Direct/Indirect photostencils, Capillary direct film photostencils; Faults and their Causes.

UNIT III PRINTING ON FLAT AND IRREGULAR SUBSTRATES 9

Design Considerations; Screen printed products, Flat substrates, Three dimensional objects; Printing factors.

UNIT IV PRINTING MACHINERY AND EQUIPMENT 9

Hand-bench Printing Equipment – Flat printing base with a vacuum suction facility, Hinge assembly, Frame counterbalance, Frame clamping system, Front and rear 'off-contact' adjustment, Register adjustment; Screen Printing Machines – Flat-bed hinged frame, Flat-bed vertical lift, Cylinder-bed presses, Container printing machines, Rotary screen.

UNIT V PROCESS PRINTING 9

Colour theory, Colour Separation, Printing sequence, Carousel Machines, Health and Safety issues, Troubleshooting

TOTAL : 45 PERIODS

OUTCOMES:

Upon completion of the course the student will be able to:

- Select the type of fabric and machine based on product requirements.
- Enumerate the sequences of operation in screen printing

TEXTBOOKS:

1. Samuel B. Hoff, "Screen Printing – A Contemporary Approach", Delmar Publishers,1997.
2. John Stephens, "Screen Process Printing; a practical guide", Blueprint Publishers,1987.

REFERENCES:

1. Ingram, Samuel, "Screen Printing Primer", GATF press, 2nd Edition, 1999.
2. William Appleton, "Screen Printing", PIRA International, 1994.
3. NIIR Board, "Screen Printing Technology Handbook", Asia Pacific Business Press Inc., 2004

EC7691 **AUTOMOTIVE ELECTRONICS** **L T P C**
3 0 0 3

UNIT I AUTOMOTIVE AND ELECTRONICS FUNDAMENTALS 9

Introduction to Automobile Engineering, Automotive Engines and Control Systems, Electronic Engine Management Systems. Introduction to Basic Electronics- Semiconductor Devices. Diodes, Rectifiers, Transistors. Logic Gates, Combinational Circuits and Microprocessors.

UNIT II MICROCOMPUTER INSTRUMENTATION AND ELECTRONICS ENGINE CONTROL 9

Microcomputer Fundamentals - Digital Vs Analog Computers, Microcomputers Vs Mainframe Computers and basic computer programming. Instrumentation Examples of Microcomputer. Electronic Engine Control- Motivation. Engine Performance Terms, Electronic Fuel Control systems, Catalytic Converters, Idle Speed Control, Electronic Ignition Systems

UNIT III SENSORS AND ACTUATORS 9

Basic Measurement System, Sensory- Airflow Sensor, Pressure Sensor, Magnetic and hall Effect Sensors, Optical Positioning Sensors. Exhaust and Knock Sensors. Automotive Engine Control Actuators- Fuel Control Actuators, Exhaust Recirculation Actuators, Electrical Motors - Brushless DC and Stepper Motors. Ignition System

UNIT IV MOTION CONTROL, INSTRUMENTATION AND TELEMATICS 9

Digital Engine Control and Features, Control Modes- Fuel Control, Engine Start, Engine Crank and Warm-Up, Speed Control Acceleration / Deceleration, EGR Control and Hybrid Electric Vehicle Powertrain Control, Electronic Steering Control and Electronic Suspension Systems. Advantages of Computer-Based Instrumentation, Digital Consoles - High-Speed Digital Communications CAN, Display Devices LED, LCD, Flat Panel Display, Trip Information Computer, Telematics, GPS Navigation and Structure.

UNIT V DIAGNOSIS AND FUTURE AUTOMOTIVE SYSTEMS 9

Electronic Control System Diagnostics, Service Bay Diagnostic Tool, Onboard Diagnostics, Model-Based Sensor Failure Detection, Diagnostic Fault Codes, Onboard Diagnosis (OBD II), Model-Based Misfire Detection System, Expert Systems in Automotive Diagnosis, Occupant Protection Systems. Future Automotive Systems- Alternative Engine, Advanced Travel and Safety Control- Collision Avoidance Radar Warning System. Low Tire Pressure Warning System. Sensor Multiplexing and Automatic Driving Control.

TOTAL : 45 PERIODS

TEXTBOOKS:

1. William B. Ribbens. "Understanding Automotive Electronics - 7th Edition. Butterworth. Heinemann Woburn. 2017
2. Tom Weather Jr and Cland C Hunter "Automotive Computers and Control System" - Prentice Hall Inc, New Jersey. July 2016
3. Tom Denton, "Automobile Electrical and Electronic System", Fourth edition, routledge, 2017.

EC7692 **ELECTRONICS ENGINEERING** **L T P C**
3 0 0 3

UNIT I ELECTRONIC COMPONENETS **9**

History, Evolution and Inventors of Electronic Components - Resistors, Capacitors and Inductors - Types, Construction and Functions, Cables - Construction, Characteristics, Types- High Impedance, Low Impedance, Ribbon, High Temperature, Flat Twin, RF, Telephone, Optical Fiber, Connectors, Switches, Relays, Displays -LED, Alphanumeric, LCD, LASER.

UNIT II DEVICES AND APPLICATIONS **9**

History, Evolution and Inventors of Elecetronics Devices- PN Junction Diodes, Zener, Bipolar Junction Transistors, Field Effect Transistors, Uni Junction Transistors, Silicon Controlled Rectifier -Working and Simple Applications.

UNIT III DIGITAL ELECTRONICS **9**

Boolean algebra, Logic Gates, Half and Full adders, Decoder, Encoder, Multiplexer, Demultiplexer, Flip flops, Digital to Analog converters, Analog to Digital converters, Real Time Multi-Charmel Data Acquisition System - Working and Demonstrations.

UNIT IV INTEGRATED CIRCIDTS AND SMD **9**

Evolution and Inventors of Integrated Circuits - Structure, Scale/Level, Classification, Surface Mount Devices and Surface Mount Technology, Printed Circuit Boards, Semiconductor Manufacturing Case Study and Industrial Visit.

UNIT V ELECTRONICS SYSTEMS **9**

Tsunami Warning System - Detection (Seismometer), Data processing and Management, Alert Signal & Messaging, E Nose - Detection (Chemical Sensors), Data processing and Classification, Agriculture Robots - Detection (Navigation, Soil and Crop Sensors), Processing, and Actuation, Automotive electronics - Engine Control, Braking, Driver Assistance, Navigation, Safety and Communication Systems- Video Illustrations.

TOT AL:45 PERIODS

TEXT BOOK:

1. Malvino, 'Electronic Principles', McGraw Book Co., 1993.

REFERENCES:

1. Grob. B and Schultz. M.E. 'Basic Electronics', Tata Mcgraw Hill, 2003.
2. Thomas L. Floyd, 'Electronics Devices', Pearson Education, 2002.
3. Thomas L. Floyd, 'Digital Fundamentals', Pearson Education, 2003.
4. Millman, Halkias Jacob, Jit Christos and Satyabrata, 'Electronic devices and Circuits', Tata McGraw Hill, 2nd Edition,
5. V. R. Deo, Electronic Components and Applications, Ane Books Pvt. Ltd.,
6.https:llwww.semiconductors.org/majn/resources, technav.ieee.orgltagJ5783/electronic-noses, www.tsunarni.noaa.gov , www.e-booksdirectory.com,
7. Make Electronics - Learning by Discovery by Charles Platt

BM7691 MANAGEMENT OF WASTES IN HOSPITALS L T P C
3 0 0 3

OBJECTIVES:

- To understand the importance of handling wastes and proper disposal.
- To teach the students about regulatory requirements of waste management

UNIT I INTRODUCTION TO WASTES 9

Hospital waste, types of medical waste, hazardous waste, infectious waste, Microbial and pathological wastes, Elements of waste management, hospital waste categorization.

UNIT II WASTE REGULATION IN INDIA 9

Environment protection Act and rules, Regulation and control rules, Management, handling and transboundary movements.

UNIT III STERILIZATION TECHNIQUES 9

Transmission of disease, related pathogens, infections and disinfectants, steam sterilization, microwave sterilization, EtO/EO sterilization and dry heat techniques.

UNIT IV WASTE DISPOSAL METHODS 9

Solid waste disposal, liquid waste disposal, hazardous and radioactive wastes destruction, waste reduction methods, incinerator, crematories.

UNIT IV SAFETY AND RISK ASSESSMENT 9

Risk management in hospitals, hazard identification and risk assessment, Environmental issues in hospitals and safety issues, Risk analysis.

TOTAL: 45 PERIODS

OUTCOMES:

Awareness of hospital wastes

- Challenges against the infectious waste
- Knowledge about disposal of wastes.

REFERENCES:

1. C.R.BRUNNER, Medical Waste Disposable Handbook, Incentrated, Consultant in Corporated, Virginia, 2000.
2. Tarannum Dana, Medical Waste Management , July 2012.

BM7692 INTRODUCTION TO BIOMATERIALS L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Learn the classification and characteristics of Biomaterials.
- Understand different types of materials used as biomaterials.
- Learn the standards and rules involved in developing biomaterials.

UNIT I DEFINITIONS AND PROPERTIES 9

Definition for biomaterials- biocompatibility-biodegradation- criteria for choosing a biomaterial- use of biomaterials in medicine-physical and chemical properties, surface properties and surface characterization.

UNIT II CLASS OF MATERIALS 9

Metals - polymers- ceramics- bioactive glasses-hydrogels- natural polymers-pyrolytic carbon-composites- smart polymers.

UNIT III RESPONSE TO MATERIALS 9

Adsorption- role of adsorbed protein in tissue response-cell adhesion- extracellular matrix-cell injury-healing process-host response to biomaterial.

UNIT IV APPLICATIONS OF BIOMATERIALS 9

Cardiacassist device- non thrombogenic treatments- dental implants- orthopedic applications-dermal treatments- ocular and extracorporeal implants.

UNIT V STANDARDS AND NEW PRODUCTS 9

Rules and regulations for developing medical products- standards- material evaluation- legal aspects of biomaterials- ethical issues in developing biomaterials.

TOTAL:45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- Analyze different types of Biomaterials and its classification.
- Perform combinations of materials that could be used as implants.

TEXT BOOKS:

1. Sujata V. Bhatt, Biomaterials Second Edition, Narosa Publishing House,2005.
2. Joon B, Park Joseph D. Bronzino, Biomaterials - Principles and Applications – CRC Press, 2003
3. H.H.Willard, D.L.Merrit,Instrumental Methods of Analysis, CBS Publishers 1992.

REFERENCES:

1. Park J.B., “Biomaterials Science and Engineering”, Plenum Press, 1984.
2. Standard Handbook of Biomedical Engineering & Design – Myer Kutz, McGraw-Hill, 2003
3. Introduction to Biomedical Engineering – John Enderle, Joseph D. Bronzino, Susan M. Blanchard, Elsevier, 2005.
4. Medical Textiles and Biomaterials for Healthcare- Edited by AC Anand, J F Kennedy, M.Miraftab, S.Rajendran, Woodhead Publishing Limited 2006
5. Materials Science and Technology: Volume 14, Medical and Dental Materials: A comprehensive Treatment Volume Editor D F Williams, VCH Publishers 1992
6. An introduction to Materials in Medicine:BD Ratner, AS Hoffmann,FJ Schoen, JE Lemmons, Academic Press 1996.

IT7691 DATABASE SYSTEMS L T P C
3 0 0 3

OBJECTIVES:

- To understand the basic database concepts, data models including the architecture and operation of the relational data model.
- To make a study of Structured Query Language (SQL) and construct simple and moderately advanced database queries using SQL.
- To conceptualize relational database design and depict a database system using ER diagram.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To develop a database application using commercial databases

UNIT I RELATIONAL DATABASES 9

File System vs. Database System -– Data Models – Database System Architecture – Introduction to Relational Databases - Relational Model - Keys -- Integrity Constraints - Relational Algebra

UNIT II SQL FUNDAMENTALS 9

SQL fundamentals - SQL Data Definition - Basic Structure of SQL Queries - Additional Basic Operations - Set Operations - Aggregate Functions - Nested Subqueries - Join Operations - Views

UNIT III DATABASE DESIGN 9

Entity-Relationship Model – ER Diagrams - Mapping ER Model to Relational Model - Functional Dependencies –Normalization - First Normal Form - Second Normal Form - Third Normal Form

UNIT IV TRANSACTION MANAGEMENT 9

Transaction Concepts - Transaction Recovery – ACID Properties - Concurrency Control – Need for Concurrency Control – Serializability - Locking Protocols – Two Phase Locking – Deadlock – Recovery

UNIT V APPLICATION DEVELOPMENT 9

Commercial Databases - Oracle/MySQL - PL/SQL - Stored Procedures - Functions - Triggers - Database Security using SQL commands

TOTAL : 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to

- List and explain the fundamental concepts of a relational database system.
- Understand and use DML, DDL and DCL to query, update, and manage a database.
- Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
- Design database using E-R modeling and apply normalization techniques over it.
- Manage the transactions that happens in a database.
- Design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

TEXT BOOK:

1 Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Sixth Edition, Tata McGraw Hill, 2010.

REFERENCES:

1. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
2. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Sixth Edition, Pearson Education, 2010.
3. Raghu Ramakrishnan, Johannes Gehrke “Database Management Systems”, Fourth Edition, Tata McGraw Hill, 2010.
4. G.K.Gupta, “Database Management Systems”, Tata McGraw Hill, 2011.
5. Carlos Coronel, Steven Morris, Peter Rob, “Database Systems: Design, Implementation and Management”, Ninth Edition, Cengage Learning, 2011

LT7691 BIOTECHNOLOGICAL APPLICATION IN LEATHER MANUFACTURE

L T P C
3 0 0 3

UNIT I PROTEINS AND NUCLEIC ACID & ENZYMOLOGY 10

Chemistry of DNA and RNA: Structure, Conformation and function Proteins - Chemistry, structure and Function Separation Principles in proteins. Classification, assay, characterization, mechanism of action, enzyme kinetics, immobilized enzymes.

UNIT II GENETIC ENGINEERING (RECOMBINANT DNA TECHNOLOGY 10

Principles and methods, Essentials of biotechnology-products of biotechnology, Restriction enzymes, vectors, DNA cloning strategies.

UNIT III BIOTECHNOLOGY FOR HIDES/SKINS IMPROVEMENT 13

Applications in Animal nutrition and animal production: embryo transfer, gene transfer, transgenic animals. Cleaner Leather Processing : Use of enzyme options in beam house operations - Soaking, unhairing, bating,degreasing, offal treatment: Types of enzymes - proteases, lipases - properties, assaay systems and production. Types of fermentation, Preparation of media,preparation of inoculum, separation and purification of products.

UNIT IV WASTE MANAGEMENT 8

General features of the organic and inorganic pollutants of tannery. Stabilisation and disposal of organic and chemical wastes and their biological treatment. Possible energy generation from wastes.

UNIT V UTILISATION OF COLLAGENOUS TISSUES FOR DIFFERENT APPLICATIONS 4

Collagen and its application in food, cosmetic and medical fields.

TOTAL: 45 PERIODS

RERERENCES

1. Rohm, H.J. and Reed, G. "A Comprehensive treatise on Biotechnology", Verlag Chemie, lecinheim,1983.
2. Pelczar, J.,Reid, R.D.and Chan, F.C.S.,"Microbiology", Tata McGraw Hill, 1977.
3. Old, R.W., and Primrose, S.B., "Principles of Gene manipulation" 3/e Cambridge, 1985.
4. Stryer, L."Biochemistry" 3/e W.H. Freeman and Co. 1989.
5. Lehninger, A.L., Nelson, D.L., Gx M.M "Principles of Biochemistry", CBS Publications, 1993
6. Puvanakrishnan, R and Dhar, S.C."Enzyme Technology in Beamhouse practices"' CLRI Publication.
7. Wrinter, N.A., "Biological treatment of waste water", 1982.
8. Schroeder, E.D., "Waste and Waste water treatment",. McGraw - Hill Inc. 1983

TT 7691 GARMENT MANUFACTURING MACHINERY

L T P C
3 0 0 3

OBJECTIVES

- To impart knowledge on the machineries and equipments used for garment production
- To instruct on latest developments in the garment production machineries.

UNIT I FABRIC INSPECTION AND SPREADING MACHINES 9

Garment manufacture – sequence of operations; introduction to pattern making, marker planning, cutting, sewing and finishing; fabric inspection machine – manual and automatic, fabric control; spreading machines – manual, semi-automatic and fully automatic machines, fabric control devices in spreading machines

UNIT II CUTTING MACHINES 9

Mechanism of straight knife cutting machines, rotary cutting machines, band knife cutting machines, die cutting, laser cutting, plasma cutting, water jet cutting and ultra-sonic cutting; Notches, drills and thread markers; computer interfaced cutting machines.

UNIT III SEWING MACHINES 9

Lock stitch and chain stitch sewing machine - types, driving arrangement, function of elements, stitch formation, timing, settings and feed mechanism; needles – geometry, types and selection of machine and process parameters for different applications.

UNIT IV SPECIAL SEWING MACHINES 13

Over lock, flat lock, feed off arm, button fixing and button holing –driving arrangement, stitch formation, timing, settings and feed mechanism.

UNIT V FINISHING MACHINES 5

Pressing machineries – buck pressing, iron pressing, block or die pressing, form pressing, steamers and advanced pressing machineries; folding and packing machines.

TOTAL: 45 PERIODS

OUTCOMES

After successful completion of this course, the students would understand the,

- Principle and working of machines used for fabric inspection, spreading and cutting
- Working of sewing machine, special sewing machine and finishing machines used for garment manufacture.

REFERENCES

1. Harold Carr& Barbara latham, “The Technology of Clothing Manufacture”, Black well Sciences, 1996
2. Jacob Solinger., “Apparel Manufacturing Handbook “, Van Nostrand Reinhold CompanY,1980
3. Ruth E. Glock and Grace I. Kunz, “Apparel Manufacturing Sewn Product Analysis”,Pearson Prentice Hall, 2005

TT7692 TECHNICAL FIBRES L T P C
3 0 0 3

OBJECTIVES

- To enable the students to learn about production, properties and application of various technical fibres

UNIT I 9

Introduction: Classification of textile fibres according to their nature and origin, essential and desirable properties of textile fibres, staple fibre and continuous filament, comparison of natural and manmade fibres.

UNIT II 9

Linear polymer fibres, polyaramide fibres, high modulus-high tenacity polyethylene and other such fibres; their structure, properties and applications

UNIT III 9

Carbon fibres, classification – based on raw materials, heat treatment, strength and modulus; physical properties and applications glass fibres, classification, principle of fibre manufacturing, physical properties and applications

UNIT IV **9**

Chemical resistance fibres- their structure, properties and applications; thermal resistance fibres, their structure, properties and applications

UNIT V **9**

Ceramic fibres, classification, effect of heat treatment on properties, physical properties and applications; derivatives of ceramic fibres; hollow and profile fibres- properties and applications

TOTAL : 45 PERIODS

OUTCOMES

Upon the completion of this course, the students will have knowledge on

- Technical fibre production
- Properties and their application.

REFERENCES

1. Kothari V.K., "Textile Fibres: Development and Innovations", Progress in Textiles, Vol. 2, IAFL Publications, 2000.
2. Hearle J.W.S., "High Performance Fibres", Woodhead Publishing Ltd, Cambridge, England, 2001.
3. Peebles L.H., "Carbon Fibres", CRC Press, London, 1995.
4. Hongu T. and Phillips G.O., "New Fibres", Woodhead Publishing Ltd., England, 1997.

CT7691 **CERAMIC PROPERTIES** **L T P C**
3 0 0 3

OBJECTIVES

- The course is aimed to impart basic knowledge about the properties of a ceramic material when subjected to various environmental conditions

UNIT I INTRODUCTION **9**

Ceramics - traditional ceramics - classification, manufacturing process, testing and quality control, Advanced ceramics - classification, powder preparation, forming, sintering, properties - density, porosity, microstructure.

UNIT II MECHANICAL PROPERTIES **9**

Elasticity - modulus of elasticity, stiffness, Poisson's ratio, modulus of rupture, strength - theoretical strength, measurement, fracture - brittle, ductile, fracture toughness - fatigue – creep

UNIT III THERMAL PROPERTIES **9**

Heat capacity - thermal conductivity - thermal expansion - thermal stress - thermal shock resistance

UNIT IV ELECTRICAL AND ELECTRONIC PROPERTIES **9**

Fundamentals - band theory - classification based on resistivity - Matheissen's rule - conduction mechanism - electronic conduction, ionic conduction, semiconducting ceramics - dielectric-polarization, types, dielectric constant, dielectric strength, dielectric loss.

UNIT V MAGNETIC AND OPTICAL PROPERTIES **9**

Magnetic properties - fundamentals - classification - hystersis - super exchange mechanism, Optical properties - fundamentals - interaction with solids - color - opacity - translucency.

TOTAL : 45 PERIODS

OUTCOME

On completion of the course the students are expected to

- Have a basic knowledge about ceramics and its processing methods
- Have knowledge about the response of the material to mechanical, thermal, electronic, magnetic and optical changes.

REFERENCES

1. David W Richerson, 'Modern Ceramic Engineering', Taylor & Francis, 2006.
2. Barry Carter C and Grant Norton M, 'Ceramic Materials Science and Engineering', Springer, 2013.
3. Saxena, B.S., R.C. Gupta and P.N. Saxena, 'Fundamentals of Solid State Physics', Pragathi Pragasan, Meerut, 1988.
4. V.Raghavan and Asoke K. Ghosh, 'Material Science and Engineering' , Prentice hall of India Pvt. Ltd, 2004.
5. Arzamasov, B., 'Materials Science', Mir Publishers, Moscow,1989.
6. William D Callister.Jr, 'Materials Science & Engineering', John Wiley & Sons, 2000.
7. O.P.Khanna and ISH Kapur, 'Material Science & Metallurgy', Dhanpat Rai publications, 2002.
8. John Martin, 'Materials for Engineering', 2nd edition, Woodhead publishing & Maney Publishing, 2002.
9. G. S. Upadhyaya and Anish Upadhyaya, 'Materials Science & Engineering' , Viva Books Pvt.Ltd, 2006.
10. R.W.Cahn, P.Haasen and E.J.Kramer, 'Material Science & Technology' Vol.5 , VCH Verlagsgesellschaft MBH, 1991.

CT7692 CERAMIC APPLICATIONS L T P C
3 0 0 3

OBJECTIVES

- The course is aimed to impart basic knowledge about the various fields of applications of ceramic materials

UNIT I CERAMICS IN ENERGY AND STORAGE 9

Solid oxide fuel cell - photovoltaic solar cells - DSSC - ceramics in batteries - lithium ion batteries - ultra capacitors - producing and storing hydrogen - energy harvesting - catalyst & catalyst supports

UNIT II CERAMICS IN COATINGS 10

Introduction - Areas of Application of Ceramic Films and Coatings - Processing of Ceramic Films and Coatings - Characterization of Ceramic Films and Coatings - CVD Coated Cutting Tools - Wear Resistant Thin Films by Ion Implantation - Corrosion Resistant Thick Films by Enamelling - Plasma Sprayed Ceramic Coatings - Sol-Gel Derived Ceramic Coatings

UNIT III CERAMICS IN BIOLOGY AND MEDICINE 9

Bioceramics - classification - ceramic implants & structure of bone - bioactive glasses - bioactive glass ceramics - hydroxyapatite - bioceramics in composites - bioceramic coatings - nano bioceramics - dental ceramics.

UNIT IV CERAMICS IN NUCLEAR REACTORS 8

Types of reactors - structure, preparation and properties of oxides, carbides, nitrides and composites used in fission & fusion nuclear reactors.

UNIT V CERAMICS IN SPACE 9

Material aspects of missile & satellite re-entry - Ceramic Materials for aerospace propulsion components - auxiliary space powder devices - rocket nozzle technology.

TOTAL : 45 PERIODS

OUTCOME

On completion of the course the students are expected to

- Have a basic knowledge about ceramics materials used in energy applications
- Have knowledge about ceramic materials used in coating applications
- Have knowledge about ceramic materials in biological and medical applications
- Have knowledge about the use of ceramic materials in nuclear and space applications

REFERENCES

1. John D Wachtman, Richard A Haber, 'Ceramic Films and Coatings', Elsevier Publications, 1993.
2. Barry Carter C and Grant Norton M, 'Ceramic Materials Science and Engineering', Springer, 2013.
3. Yamamura T, Hench L.L and Wilson J, CRC Handbook of Bioactive Ceramics, Vol I & II, CRC Press, Boca Raton, 1990.
4. Narottam P.Bansal and Jacques Lamon, 'Ceramic Matrix Composites Materials, Modeling & Technology', John Willey & sons, 2014.
5. Park J.B, 'Biomaterials: An Introduction', Plenum Press, New York, 1979.
6. Merrite L.C, 'Basic Principles of Nuclear Science and Reactors', Wiley Eastern,1977.
7. Benedict M and Pigter T.A, 'Nuclear Chemical Engineering', McGraw Hill, 1981.
8. Norton, F.H, 'Fine Ceramics, Technology and Applications', McGraw Hill, London, NY, 1970.
9. Terpstra, 'Ceramic Processing', Chapman and Hall, 1995.
10. Gan-Moog, chow and Kenneth E Gonslaves, 'Nanotechnology', American Chemical Society, 1996.

PM7691 INTRODUCTION TO DRUG DISCOVERY AND DEVELOPMENT L T P C

3 0 0 3

UNIT I 9

Introduction to drug discovery methodologies – conventional drug discovery and rational drug design, structure based drug design and ligand based design, bioinformatics in drug design, sources of drugs/leads – serendipity, random screening, natural sources, target identification and validation molecular modification, lead optimization, preclinical trial and clinical trial.

UNIT II 9

Physico-chemical properties of drugs and their importance in drug discovery, Lipinsky rule of 5, concepts on pharmacophore and toxicophores, analogues, *in-silico* log P, log D values calculations, Modification of leads to suite ADMET properties and case studies from recent reviews and literatures, Chemoinformatics in drug discovery process.

UNIT III 9

Techniques and tools in modern drug discovery - Introduction to QSAR, 2-D and 3-D QSAR, Parameter analysis – lipophilicity and related parameters, electronic parameters, steric parameters, other parameters; Quantitative models – Hansch approach, Free Wilson analysis, the mixed approach; Statistical methods of validation– regression analysis, partial least square Molecular Mechanics, introduction to Molecular dynamics and its application in drug discovery process.

UNIT IV **9**

Introduction to *in-vitro* screening methods in drug discovery – HTS (High-Throughput Screening) design of various HTS strategies such as photometry, purification process, electrophoresis, kinetic assay, radioisotopes, immunoassay, miniaturization, Target and endpoint selection, combinatorial drug library screening, Knock-out models in drug screeing, RNAi methodologies, Microarray systems in drug discovery process

UNIT V **9**

Introduction to docking strategies in drug discovery and design, drug target databases, graphical representation of ligand and targets (tools such as Pymol, COOT), small molecule databases, conformation and various search methodologies, molecular docking and scoring functions, structure based de novo Ligand design, with emphasis on case study examples.

TOTAL : 45 PERIODS

TEXT BOOKS / REFERENCES:

1. Burger's Medicinal Chemistry, Drug Discovery and Development. 7th Edition Volume 1-9. By Donald J. Abraham, David P. Rotella. August 2010.
2. The Organic Chemistry of Drug Design and Drug Action, Richard Silverman, 2nd Edition, 2004.
3. Comprehensive Medicinal Chemistry, Series Ed. Hansch C., Vols 1-5, Pergamon Press.
4. Lednicer, D. "Strategies for Organic Drug Discovery Synthesis and Design"; (1998) Wiley International Publishers
5. 3D QSAR in Drug Design: Theory, Methods and Applications, Kubinyi H Ed., Leiden ESCOM, 1993.
6. Molecular Modelling – Principles and Applications, Andrew R Leach, 2nd Ed., Prentice Hall, 2001.
7. Practical Application of Computer-Aided Drug Design, Paul S Charifson, Ed., Marcel Dekker, Inc., 1997.
8. Textbook of Drug Design and Discovery, Povl Krogsgaard-Larsen, Ulf Madsen, Kristian Stromgaard, 4th Edition, 2009. Taylor and Francis.
9. Antitargets: Prediction and Prevention of Drug Side Effects, Roy J. Vaz, Thomas Klabunde, Raimund Mannhold, Hugo Kubinyi, Gerd Folkers March 2008.
10. Analogue-based Drug Discovery I and II, Janos Fischer C. Robin Ganellin August 2010.
11. Chemoinformatics in Drug Discovery by Tudor I. Oprea, Raimund Mannhold, Hugo Kubinyi, Gerd Folkers, May 2005.

PM7692 **CHEMISTRY OF SYNTHETIC DRUGS** **L T P C**

3 0 0 3

UNIT I **9**

Introduction to chemistry of medicinally active compounds and their historic development; classification of drugs based on chemical structure and mode of action; Review of chemical bonding, types of organic reactions relevant in drug synthesis, reactive intermediates, inductive, electromeric and mesomeric effects in drug synthesis, role of substitution of functional groups affecting drug action, stereochemistry of drug structure and mechanism.

UNIT II **9**

Synthetic Methodologies such as oxidation, reduction, carbon-carbon bond forming reactions including organo-metallic methods, Protection and deprotection methods. Introduction to the theory of drug receptors and classification of receptors; Introduction to the role of drug structure in metabolism and elimination, biotransformation (phase I and phase II reactions) and prodrugs

UNIT III **9**

Introduction to chemistry, structure and synthesis of heterocyclic compounds such as pyrrol, furan, thiophene, pyridine, pyrimidine, pyrazine, indole, quinoline and Isoquinoline (with prototype drug examples for each category), Structural Activity Relationship (SAR) and mechanism of action and use

UNIT IV **9**

Chemistry of compounds available in nature with biologically active moieties and semisynthetic compounds such as Alicyclic compounds (terpenes, camphor, menthol, carotenes), Alkaloids (Atropine, morphine, codeine, reserpine, ephedrine), Vitamins (water and fat soluble)– their synthesis, mechanism of action and therapeutic uses

UNIT V **9**

Chemistry, structure, mechanism of action, SAR, synthesis and therapeutic uses of – synthetic hormonal drugs and steroids, antiviral agents, anthelmintics, CNS drugs, analgesiscs, NSAIDS, anti neoplastic agents (with prototype drug examples for each category)

TOTAL: 45 PERIODS

TEXTS/REFERENCES:

1. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry. 10th edition, Lippincott-Raven Publisher, 1998.
2. Nogrady, Thomas, "Medicinal Chemistry: A Biochemical Approach", 2nd Edition, Oxford University Press, 2004.
3. William O. Foye, Thomas L. Lemke and David A. William. Principles of Medicinal Chemistry, 4th edition, 1995.
4. Hansch C, Sammes P.G. Toylor J.B. Comprehensive Medicinal Chemistry, Pergamon Press, Oxford, 1990.
5. Gurdeep Chatwal, "Organic Chemistry of Natural Products", Vol-II, Third eition, Himalaya Publishing House, 1996.

IB7691 **OVERVIEW OF BIOSAFETY** **L T P C**
3 0 0 3

UNIT I INTRODUCTION **9**

Biosafety and biocontainment – concepts and strategies, risk assessment, biosafety programs, risk communication

UNIT II WORKING ENVIRONMENT **9**

Biological safety cabinets – level I, II, III, sample – collection, processing, storing, indexing and storage. Cleanrooms.

UNIT III SAMPLES **9**

Animal, Plant, stem cells and genetically modified organisms – handling and maintainence, disinfection and decontamination, facility operation and maintainence, - USwaste management.

UNIT IV ETHICAL GUIDELINES **9**

Bioethics, Regulations on place in India for research on animal, plant, stem cells and genetically modified organisms, regulations in other countries – US (FDA/ GMP), European standard levels, emergency planning and response

UNIT V LAB PRACTICES 9

Good laboratory practices, quality systems in the laboratory, laboratory controls, safety hazards, documentation.

TOTAL : 45 PERIODS

TEXTBOOKS AND REFERENCES

1. Biosafety in Microbiological and Biomedical Laboratories, 5th ed.
2. Biological Safety, Principles and Practices, 4th ed. (Fleming & Hunt)
3. Guide For The Care and Use of Laboratory Animals, 8th ed. (National Research Council)
4. Control of Communicable Diseases Manual, 20th Ed. (Heymann)
5. Institutional Animal Care and Use Committee Guidebook, 2nd ed.
   NIH Guidelines For Research Involving Recombinant or Synthetic Nucleic Acid Molecules (201 3)
6. Laboratory Biosafety Manual, 3rd ed. (WHO)

IB7692 FORENSIC SCIENCE L T P C
3 0 0 3

UNIT I INTRODUCTION 9

Forensic science: Definition, History and Development. Types of crime, crime scene management and investigation; Collection, Preservation and forwarding of physical and trace evidences for analysis. Legal and court procedures.

UNIT II BLOOD BASED ANALYSES 9

Blood based analysis, analysis of body fluids, Disputed paternity and maternity problems. DNA profiling.

UNIT III SAMPLE ANALYSIS 9

Analysis of liquor; petroleum products; Examination of insecticides and pesticides; Identification of poisons; identification of fibres. Physical analysis of soil, glass, paints, lacquers, cement, inks, paper, and tool marks, foot prints and shoe prints

UNIT IV MATERIAL ANALYSIS 9

Examination of vehicles, tyre marks, Ballistics, cyber forensics, Identification of handwriting, signatures, anonymous, disguised writings and forgery detection. Age of documents. History, classification, search, lifting and examination of fingerprints .

UNIT V INSTRUMENTATION 9

Microscopy, spectroscopy, X-rays, NMR, Chromatography, Electrophoresis

TOTAL : 45 PERIODS

TEXTBOOKS:

1. Forensic Science -2008, Embar-Seddon, A and Pass A (Ed), Volumes 1-3 (page 365, 366,
2. B. R. Sharma: Forensic Science in Criminal Investigation and Trials, Fourth Edition, Universal Law Publishing
3. B. Levine: Principles of Forensic Toxicology, 3rd Ed., AACC Press, 2010.
4. Richard Saferstein, 2001, Criminalistic: An Introduction to Forensic Science. 7th edition Prentice-Hall, New Jersey
5. Fishes, B.A.J., 2000. Techniques of Crime Scene Investigation. VI edition CRC Press, Boca Raton, 2000

REFERENCES:

1. Koppenhaver, K. (2007) Forensic Document Examination, Principles and Practice Humana Press
2. An Introduction to Forensic DNA Analysis, Rudin, Norah CRC Leviw Publishers, (2002)
3. Digital forensic for network internet and cloud computing clint garrison
4. Clarke's Analytical Forensic Toxicology by A. Negrusz and G. Cooper, 2nd Ed., Pharmaceutical Press, 2013.
5. Handbook of Fingerprint Recognition, Maltoni, Maio, Jain, Prabhakar, 2005

FT7691 EMERGING TECHNOLOGIES IN FOOD CONTROL L T P C
3 0 0 3

UNIT I LOW TEMPERATURE AND HIGH TEMPERATURE PRESERVATION 9

Low temperature - Refrigeration-Chilling- Freezing, methods of freezing, effect of low temperature on food. Preservation of food by high temperature: Basic concepts in thermal destruction of microorganisms D, Z, F, values. Microorganism associated with high temperature and low temperature foods. Blanching, pasteurization and sterilization of foods. Canning and aseptic processing of food. Other preservation techniques - Dehydration, evaporation.

UNIT II OSMOTIC DEHYDRATION & FERMENTATION OF FOODS 9

Principle – Mechanism of osmotic dehydration – Effect of process parameters on mass transfer – Methods to increase the rate of mass transfer – Applications – Limitations of osmotic dehydration – Management of osmotic solutions Fermentation: Applications in preservation of food; yogurt, pickling, curing etc. Probiotics - role- processing - applications - Evaluation of probiotic foods as per international norms.

UNIT III OHMIC, RADIATION AND ULTRASOUND PROCESSING OF FOODS 9

Principle of ultrasound – Fundamentals – Ultrasound as a processing and preservation aid – Effect on properties of foods Basics of ohmic heating – Electrical conductivity – generic configurations-treatment of products Irradiation - Sources of radiations, applications of food irradiation. Mode of action, effect on microorganisms and different nutrients; dose requirements for radiation preservation of foods. Measurement of radiation dose, detection of irradiated foods, safety of irradiated foods, Infra red radiation processing- Concepts and equipment used.

UNIT IV NON THERMAL PROCESSING OF FOOD 9

Edible coating, extrusion cooking, HPP: Principles – applications to food systems – effect on quality – textural, nutritional and microbiological quality – factors affecting the quality – modeling of high pressure processes – High Pressure Freezing, Principles and Applications.PEF: Principles – Mechanism of action – PEF treatment systems – Main processing parameters – PEF Technology – Equipments – Mechanism of microbial and enzyme
inactivation- safety aspects– Processing of liquid foods using PEF – Process models – Comparison of High pressure processing and PEF – Enzymatic Inactivation by PEF,Examples – Microbiological and chemical safety of PEF foods

UNIT V HURDLE TECHNOLOGY 9

Basics of hurdle technology – Mechanism Application to foods - Newer Chemical and Biochemical hurdles- organic acids – Plantderived antimicrobials – Antimicrobial enzymes – bacteriocins – chitin / chitosan (only one representative example for each group of chemical and biochemical hurdle)

TOTAL : 45 PERIODS

TEXT BOOKS

1. Da-wen Sun: Emerging Technologies for Food Processing, Elsevier Academic Press Marcel Dekker Inc. NY (1995)

REFERENCE BOOKS

1. Leistner L. and Gould G. Hurdle Technologies – Combination treatments for food stability safety and quality, Kluwer Academics / Plenum Publishers, New York (2002)
2. Novel Food Processing Technologies(Food Science and Technology Series) by Gustavo V. Barbosa-Canovas, Maria S. Tapia, M. Soledad Tapia, M. Pilar Cano, Publisher: CRC Press, November 2004, ISBN-13: 9780824753337,
3. Pulsed electric fields in food processing: Fundamental aspects and applications: a volume in the Food Preservation Technology series, Edited by G V Barbosa-Cánovas, Washington State University and Q H Zhang, Ohio State University, USA, Woodhead Publishing Limited, Abington Hall, Abington, Cambridge, CB1 6AH, England, 2001
4. Pulsed electric field technology for the food industry: Fundamentals & applications (Food engineering series) RASO J., HEINZ V, 2006
5. Ohmic Heating: A Value-added Food Processing Tool Marybeth Lima, Tuoxiu Zhong and N. Rao Lakkakula
6. Thermal Technologies in Food Processing: Edited by P Richardson, Campden and Chorleywood Food Research Association, UK, Woodhead Publishing Limited, Abington Hall, Abington, Cambridge, CB1 6AH, England, 2001
7. Minimal Processing Technologies in the Food Industry By Thomas Ohlsson, Nils Woodhead Publishing Limited, Abington Hall, Abington, Cambridge, CB1 6AH, England, 2002
8. Pulsed Electric Fields in Food Processing (1999). Gustava C Barbosa-Canovas, Q Howard Zhang (editors). Lancaster Pa: Technomic Publishing Co. (ISBN 1566767830)
9. Food Processing Operations Modelling (2001). Joseph Irudavarai (editor). Marcel Dekker (ISBN 0824704886)
10. Processing of Foods – Quality Optimization and Process Assessment Edited by Fernando A.R.Oliveira and Jorge C. OliveiraCRC Press Boca Raton, London and New York 1999 11. Food Processing Hand Book, Edited by James G.Brennen Wiley – VCH Verlog GmbH 2006

FT7692 CROP PROCESS ENGINEERING L T P C
3 0 0 3

UNIT I INTRODUCTION 9

Scope and importance of food processing, post harvest losses, principles and methods of food processing. Principle of size reduction, grain shape, size reduction machines; crushers, grinders, cutting machines etc. – operation, efficiency and power requirement – Rittinger's, Kick' s and Bond' s equation, fineness modulus. Theory of separation, size and unsized separation, types of separators, size of screens, sieve analysis, capacity and effectiveness of screens, pneumatic separation.

UNIT II PROCESSING OF RICE AND PULSE 9

Rice processing – parboiling, drying, dehusking, polishing, modern rice mill machineries – construction details and adjustments, layout of modern rice mill. Pulse milling – pre-treatments of pulses, wet and dry method, machinery used for dhal milling.

UNIT III PROCESSING OF WHEAT AND MILLETS 9

Wheat milling – methods, corn milling – wet milling , dry milling, oats processing, Soy bean processing, Processing of sorghum, ragi, barley – malting of barley. Breakfast cereals. Processed products. Extruded products.

UNIT IV PROCESSING OF PLANTATION CROPS 9

Processing of tea and Coffee, instance coffee. Processing of cocoa, cashew nut processing, Equipment used - processed products.

UNIT V PROCESSING OF SPICE AND CONDIMENTS 9

Processing of pepper, chilli, turmeric, cardamom. Tuber crops- tapioca, potato processing – processed products.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Unit operations in Agricultural Processing by Sahay and Singh.
2. Chakravarty,A . (1995). Post Harvest technology of Cereals,Pulses and Oil Seeds. Oxford and IBH Pub.Co., Calcutta.
3. Earle,R.L. (1985). Unit Operations in Food Processing. Pergamon Press, Oxford.U.K.
4. Handerson,S.M and Perry,R.L. (1955). Agrl.Process Engg. John,Willey & Sons, New York.

REFERENCE BOOKS

1. Kent Jones, "Cereal Technology"
2. Kent, "Technology of cereals"
3. Sivetz and Foote, “Coffee processing Technology”, AVI publishing Co.,
4. Carl.W.Hall. (1980). Crop drying. AVI Publishing Co. Inc.
5. Fellows,P . (1993). Food Processing technology, Principles and Practice. Ellis Horwood,USA.

CH7691 DRYING TECHNOLOGY L T P C
3 0 0 3

UNIT I 9

Humidification – Equilibrium, humidity chart, adiabatic and wet bulb temperatures; humidification operations; Drying and dehydration – basics and principles. Mechanism of drying – drying curves, drying rate periods – constant and falling rate periods, effect of drying on water activity, EMC, sorption isotherms.

UNIT II 9

Classification of dryers – Based on mode of operation, mode of heat transfer – conduction, convection and radiation. Based on feed properties. Selection of dryers - energy costs, safety, and environmental factors. Conventional versus innovative drying techniques. Tray dryer – principle operational aspects and design.

UNIT III 9

Solar drying– principle, types of solar dryers – direct, indirect and mixed mode. Green house solar dryers. Osmotic dehydration – principle, osmotic agents, factors affecting osmotic dehydration, effect of water activity. Osmo convective drying, applications, advantages and limitations.

UNIT IV 9

Rotary dryer – principle, types, applications, freeze drying – phase diagram of water, principle – freezing, primary and secondary drying stage. fluidized bed drying - principles of fluidization, types of fluidized bed dryers, pneumatic drying – principle, working mechanism, applications.

UNIT V 9

Drum drying – principle, types of drum driers – single and double drum driers. types of feeding system. Foam mat drying – principles, foaming agents, foaming properties, continuous foam mat dryer. Spray drying – principle, components of spray dryer - atomizer types. Single stage and double stage spray dryer. Design aspects, advantages and limitations.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Mujumdar A.S., "Handbook of Industrial drying", 3rd Edition, CRC press, Taylor and Francis group.UK.2007.
2. Xiao Dong Chen and Mujumdar A.S, "Drying Technologies in Food Processing", 1st Edition, Wiley-Blackwell, 2008.
3. Treybal, R.E., "Mass Transfer Operations ", 3rd Edn., McGraw-Hill, 1981.

REFERENCE BOOKS:

1. Jangam S.V., Chung Lim Law and Mujumdar A.S., —Drying of Foods, Vegetables and Fruits‖, Volume 1, Electronic Version, 2010.
2. Hii, C.L., Jangam S.V., SzePhengOng and Mujumdar, A.S., —Solar Drying: Fundamentals, Applications and Innovations‖, Electronic Version, 2012.
3. Toledo R.T., —Fundamentals of Food Process Engineering‖, Springer, 2007.

CH7692 FUNDAMENTALS OF INDUSTRIAL CORROSION L T P C
3 0 0 3

UNIT I GENERAL CORROSION PROCESSES, BASIC PRINCIPLES 9

Definition of Corrosion, types, different forms of corrosion, uniform, Galvanic, Crevis, pitting, selective leaching, erosion, stress-corrosion, cracking – Cavitation phenomena & their effects – Corrosion testing – Field testing – Electrochemical techniques for measurement of corrosion rates, chemical corrosion, Electrochemical corrosion.

UNIT II CORROSION IN CHEMICAL INDUSTRY 9

High temperature corrosion, modes of corrosion failures, mechanisms, inspection, monitoring and managing corrosion damage, non destructive evaluation (NDE),cathodic and anodic protection, anodic protection in pulp and paper industry, corrosion resources for the chemical inhibitor industry, Monitoring , above -ground monitoring, in –line monitoring, remote monitoring.

UNIT III CORROSION IN OIL AND GAS INDUSTRY 9

Types of corrosive environments, pipeline corrosion internal corrosion mitigation and monitoring for pipelines, corrosion and inspection managements in chemical processing and petrochemical industries

UNIT IV CORROSION IN OTHER INDUSTRIES 9

Corrosion in power equipments industry, corrosion in electrical and electronic industry — corrosion aspects in nuclear power plants – corrosion of surgical implants and prosthetic devices.

UNIT V MANAGEMENT 9

Risk assessment, risk management, corrosion risks, activities of corrosion management, life cycle cost, corrosion protection management in specific industry.

TOTAL : 45 PERIODS

TEXT BOOKS

1. Fontana, M.G., "Corrosion Engineering", Edn 3, McGraw Hill, 1989
2. Corrosion Control in the Oil and Gas Industry 1 st Edition, Sankara Papavinasam , 2013

REFERENCE

1. Roberge, P.R., Handbook of Corrosion Engineering, McGraw-Hill, 2000.

AS7691 LIFESTYLE MODIFICATIONS AND HEALTH IN UNISON L T P C
3 0 0 3

AIM

- To sensitize and create an awakening among the course participants on adhering to principles of healthy living and instilling lifestyle modifications.

OBJECTIVE

- To cause behavioral changes in the learning clientele and creating the necessary psycho sociological ramifications, motivating the participants to adopt a healthy life style.

UNIT I IMPORTANCE OF MICRONUTRIENTS AND ADHERING TO LOW GLYCEMIC INDEX FOODS 9

Millets and fibre rich foods –Their high nutritive value –Dangers of consumption of refined foods – Iron protein combination –Micronutrients–Their importance in upkeep of good health –Overcoming their deficiency –Foods rich in micronutrients –Glycemicindex -Its importance –Comparative glycemic index of various foods.

UNIT II IMMUNIZATION SCHEDULING – NEED FOR ADHERENCE 9

Protein calorie malnutrition –Importance of intake of folic acid supplements to prevent genital abnormalities –Necessity to avoid early marriage –Need for various immunizations their dosage schedules-Need to immunize adolescent girl children to prevent cervical cancer.

UNIT III LIFE SAVING CHILD SURVIVAL STRATEGIES 9

Drastically cutting down mortality and morbidity –Causative factors of dehydration –Warning symptoms - Need to administer lifesaving Oral Rehydration Salt solution (ORS) Methodology of preparing ORS solution-Importance of zinc as an additive.

UNIT IV STRATEGIES FOR INCREASING HDL AND LOWERING LDL CHOLESTEROL 9

Healthy fats –Need to avoid saturated and trans fats - Optimum value of HDL and LDL cholesterols –Need to lower triglycerides - Ways of reducing bad LDL cholesterol –Role of Thyroid Simulating Hormone (TSH) - Importance of mental health –Positive and optimistic outlook on life – Pranic breathing as a stress relief mechanism.

UNITV DRINKING WATER STANDARDS 9

WHO Standards of drinking water – Importance of dissolved oxygen – Effect of biodegradable organic particulate matter on dissolved oxygen – Estimation of sulphate in water – air pollution hazards – Domestic air pollutants.

TOTAL: 45 PERIODS

REFERENCE

1.KedarN.Prasad, Micronutrients in Health and Disease, CRC Press, 1st Edition, 2010

AS7692 BASICS OF BIOCHEMICAL TECHNOLOGY L T P C
3 0 0 3

OBJECTIVE:

- This course mainly discusses the role of enzymes and microbes in biotechnology sectors.

UNIT I INDUSTRIAL BIOTECHNOLOGY 9

Introduction to biochemical process industries. Industrial alcohols, antibiotics, acids, alcoholic beverages, enzymes, vitamins, single cell protein. Food processing and biological waste treatment. Interaction of chemical engineering principles with biological sciences.

UNIT II KINETICS OF ENZYME ACTION 6

Kinetics of enzyme catalyzed reaction: the enzyme substrate complex and enzyme action, modulation and regulation of enzyme activity, types of inhibition. Immobilized enzyme technology: enzyme immobilization, Immobilized enzyme kinetics

UNIT III KINETICS OF MICROBIAL GROWTH 9

Kinetics of cellular growth in batch and continuous culture, models for cellular growth unstructured, structured and cybernetic models , medium formulation. Thermal death kinetics of cells and spores, stoichiometry of cell growth and product formation

UNIT IV FERMENTOR 9

Modeling of batch and continuous fermentor. Bioreactor design, mixing phenomena in bioreactors. Sterilization of media and air, sterilization equipment, batch and continuous sterilize design.

UNIT V DOWN STREAM PROCESSING 12

Down stream processing: Strategies to recover and purify products; separation of insoluble products, filtration and centrifugation; cell disruption-mechanical and non-mechanical methods; separation of soluble products: liquid-liquid extractions, membrane separation (dialysis, ultrafiltration and reverse osmosis),chromatographic separation-gel permeation chromatography, electrophoresis, final steps in purification –crystallization and drying.

TOTAL : 45 PERIODS

OUTCOME:

- Upon completion of this course, the students would develop the ability to design novel bioprocesses for their research in various areas. They will have the ability to find solutions to the problems which occur when materials and processes interact with the environment.

TEXT BOOKS:

1. Biochemical engineering fundamentals by J.E.Bailey and D.F.Ollis, 2nd ed, 1986, McGraw Hill.
2. Bioprocess Engineering by Michael L. Shuler and FikretKargi, 2nd edition, Pearson education.

REFERENCES:

1. Biochemical engineering by James M.Lee – Prentice-Hall-1992.
2. Bioprocess engineering principles, Pauline M. Doran, Academic Press.
3. Biochemical Engineering, H.W. Blanch and D.S. Clark, Marcel Dekker, 1997.

HS7691 ENGLISH FOR COMPETITIVE EXAMINATIONS L T P C
3 0 0 3

Course Description:

Students aspiring to take up competitive exams of which the English language is a vital component will find this course useful. Designed for students in the higher semesters, the course will help students to familiarise themselves with those aspects of English that are tested in these examinations.

Objectives:

- To train the students in the language components essential to face competitive examinations both at the national (UPSC, Banking, Railway, Defence) and the international level (GRE, TOEFL, IELTS).
- To enhance an awareness of the specific patterns in language testing and the respective skills to tackle verbal reasoning and verbal ability tests.
- To inculcate effective practices in language-learning in order to improve accuracy in usage of grammar and coherence in writing.

UNIT I **9**

Orientation on different formats of competitive exams - Vocabulary – Verbal ability – Verbal reasoning - Exploring the world of words – Essential words – Meaning and their usage – Synonyms-antonyms – Word substitution – Word analogy – Idioms and phrases – Commonly confused words – Spellings – Word expansion – New words in use.

UNIT II **9**

Grammar – Sentence improvement –Sentence completion – Rearranging phrases into sentences – Error identification –Tenses – Prepositions – Adjectives – Adverbs – Subject-verb agreement – Voice – Reported speech – Articles – Clauses – Speech patterns.

UNIT III **9**

Reading - Specific information and detail – Identifying main and supporting ideas – Speed reading techniques – Improving global reading skills – Linking ideas – Summarising – Understanding argument – Identifying opinion/attitude and making inferences - Critical reading.

UNIT IV **9**

Writing – Pre-writing techniques – Mindmap - Describing pictures and facts - Paragraph structure – organising points – Rhetoric writing – Improving an answer – Drafting, writing and developing an argument – Focus on cohesion – Using cohesive devices –Analytic writing – Structure and types of essay – Mind maps – Structure of drafts, letters, memos, emails – Statements of Purpose – Structure, Content and Style.

UNIT V **9**

Listening and Speaking – Contextual listening – Listening to instructions – Listening for specific information – Identifying detail, main ideas – Following signpost words – Stress, rhythm and intonation - Speaking to respond and elicit ideas – Guided speaking – Opening phrases – Interactive communication –Sentence stress – Speaking on a topic – Giving opinions – Giving an oral presentation – Telling a story or a personal anecdote – Talking about oneself - Utterance – Speech acts- Brainstorming ideas – Group discussion.

Teaching Methods:

Instructional methods will involve discussions, taking mock tests on various question papers – Objective, multiple-choice and descriptive. Peer evaluation, self-check on improvement and peer feedback - Practice sessions on speaking assessments, interview and discussion – Using multimedia.

Evaluative Pattern:

Internal Tests – 50%
End Semester Exam - 50%

TOTAL: 45 PERIODS

OUTCOMES:

Students will be able to

- expand their vocabulary and gain practical techniques to read and comprehend a wide range of texts with the emphasis required
- identify errors with precision and write with clarity and coherence
- understand the importance of task fulfilment and the usage of task-appropriate vocabulary.

TEXTBOOK:

1. R.P.Bhatnagar - *General English for Competitive Examinations.* Macmillan India Limited, 2009.

REFERENCE BOOK

1. Educational Testing Service - *The Official Guide to the GRE Revised General Test,* Tata McGraw Hill, 2010.
2. *The Official Guide to the TOEFL Test,* Tata McGraw Hill, 2010.
3. R Rajagopalan- *General English for Competitive Examinations,* McGraw Hill Education (India) Private Limited, 2008.

Websites

1. http://www.examenglish.com/, http://www.ets.org/ , http://www.bankxams.com/
2. http://civilservicesmentor.com/, http://www.educationobserver.com
3. http://www.cambridgeenglish.org/in/

HS7692 PROJECT AND PROPOSAL WRITING L T P C
3 0 0 3

Course Description

This course is designed to help students develop writing skills that will enable them to produce clear and effective scientific and technical documents. Focus wii be on basic principles of good technical writing like proposals and projects. While the emphasis will be on writing, oral communication of scientific and technical information will form an important component of the course.

OBJECTIVES

The course will enable students to

- Improve grammar, mechanics and writing style for clarity, concision, coherence and emphasis and increase knowledge of technical communication
- Identify and understand the facets and functions of the primary genres of technical writing, reports, proposals and project reports
- Write and present reports to peers and groups

UNIT I Introduction to Technical Writing 9

Grammar and writing skills- writing definition- rhetorical awareness-types of technical documents

UNIT II Technical Report Writing and writing Statement of Purpose 9

Researching and managing information- technical definition/ description-collecting data- interpreting data- documenting- Analytical Reports

UNIT III Project proposal 9

Identify area of research- research question-Statement of the problem-justification of the problem- identify its feasibility- Objectives- plan of action- theorectical framework- Literature review – research design- data collection and analysis- discussion

UNIT IV Preparing project reports 9

Research methods- Abstract writing- background knowledge of the research topic- Literature review—Plagiarism- methodology- sampling- data collection and analysis- Integrate tables, figures, and other images into documents -presenting the findings- conclusion- preparing references- Appendices

UNIT V Oral presentation of the Projects (Viva voce) 9

Presentation and oral communication skills- presenting the findings of research- Maintaining audience control- body language- voice modulation- delivery of ideas etc

Teaching Methods

- Lectures
- Interactive discussions
- Self- study
- Technology enhanced learning

Evaluation pattern

- The students will be expected to write assignments
- Make oral presentation(reviews) of their projects
- Make Group discussions on research areas followed by question and answer section
- Feedback will be given immediately
- Peer Evaluation for Oral presentations

Submitting Assignments Online

Students are required to submit written assignments online

TOTAL: 45 PERIODS

Outcome

- The students will be able to writeTechnical reports, Project Proposals and Reports and make oral presentation of their findings
- Critique and revise their own documents to ensure they fulfill their purpose
- Develop strategies for addressing multiple audiences, expert and lay audiences.

Text Books

1. Willium Strunk, Jr, (1999) The Elements of Style. Boston: Allyn & Bacon.
2. Markel, Mike (2009) Technical Communication (9th Edition) Boston: Bedford/St. Martin's.

Reference Books

1. Journal of Technical Writing and Communication. Editor: Charles H. Sides, Baywood Publishing Company, Inc., 26 Austin Ave., PO Box 337, Amityville, NY 11701
2. Journal of Technical Writing and Communication, An ATTW (Association of Teachers of Technical Writing) publication. Editor: Donna Kain ,Associate Professor East Carolina University Department of English Bate 2201 Greenville, NC 27858-4353.

HS7693 ENGLISH THROUGH MEDIA L T P C
3 0 0 3

Course Description:

This course is for students who want to develop their English language skills through exploring different media such as print, electronic and social media. Learning English through media helps students to improve the target language, encourages learner independence, and develops intercultural and communicative skills.

OBJECTIVES:

- To understand and analyze different types of texts used in different media like print, online and social media
- To develop their listening, speaking, reading and writing skills by exploring the language used in media.
- To communicate effectively and persuasively in a variety of mediums, including written essays, micro blogging and live communication.

UNIT I Reading & Writing Skills 9

Reading for Information –Skimming & Scanning – Language of News: Subjective & Objective language - Reading for opinion – Analytical reading – Email writing - Writing personal opinions – Web writing: Presentation & Structure – Writing feature stories – Use of language to manipulate information

News Headlines
News articles
TV Schedules
Letters to Editor
Social media posts and comments – Blogs / Twitter / Facebook or any other social media

UNIT II Listening & Interviewing Skills 9

Listening to talks – Conversational strategies – Interviewing skills - Agreeing & Disagreeing – Asserting, Negotiating – Debating – Responding to negative criticism - Writing to instruct and advice – Describing a product & process

TV Talk shows
Podcasts
Radio / TV Interviews
TV / Radio programmes on new products & Online / Mobile Applications
Online help sections & user manuals

UNIT III Presentation skills - Visual & Verbal 9

Introduction to Phonetics & different accents – Online writing – Netiquette - Objective Reporting – Persuasive writing and speaking – Linguistic devices in Advertisements – Visual, verbal and non verbal cues - Consumer oriented marketing of products Narrating – Writing / Presenting Commentaries

News reports / Survey reports
Blog writing / tweeting
Advertisements
Documentaries on History/ Social issues
Sports / Live Commentaries on Radio / TV

UNIT IV Analyzing & Evaluating Skills 9

Vocabulary – Collocations & Slangs – Referencing - Welcoming, conducting and concluding programmes - Reviewing – Commenting – Expressing through visual and verbal media – Authentic conversation based on real – life situations – Analysing plots, vocabulary & characterization – Use of linguistic devices in broadcast media

Online Thesaurus / Mobile Dictionary
Radio / TV anchoring programmes
Book / Movie Reviews in Radio / TV
Memes in Social Media
Cartoons (Newspaper / Magazine/ TV)
TV sitcoms (Eg. Big Bang Theory, Mind Your Language)

UNIT V Reporting Skills – Oral & Written 9

Group Discussion on Culture, Tradition & Values – Critical Thinking – Problem Solving skills – Conversation etiquette – Politeness strategies – Speed Reading - Reading subtitles – Analytical Reading –Writing analytical report on websites / apps etc. - Brevity in advertising language Public Service Announcements (PSA)

TV / Radio dramas – (Eg. Xfiles, CSI)
Reality Shows (Eg. Survivor, Apprentice)
TV News programs
Animated TV series

Teaching Methodology:

This course is delivered through classroom activities, assignments and screenings to develop students' understanding of language through media. Media content will be widely used for practicing the four language skills – reading, writing, speaking and listening.

Evaluation pattern:

[Written Assignments, New App Presentation, Final Media Project, Internal Assessment]	50%
End Semester Examination	50%

Media Project

Students, in groups of 5-8 can decide on a project on any one of the unit. The requirements for the project will depend on the format / media students choose to work in. They can choose either one of the following:

- A newspaper with at least 8 pages of content.
- A thematic website can be designed which should have at least 6 pages of content.
- A podcast or video can be produced which should have material for minimum of 15 minutes.
- Create a blog, which should include daily posts for two weeks, in addition to linking to and posting on others' blogs, tagging and networking.
- Making a documentary on socially relevant issues for duration of 20 – 30 minutes.

TOTAL: 45 PERIODS

Outcomes:

By the end of the course students will be able to

- Engage critically and constructively in oral exchanges of ideas
- Improve their reading and writing ability through various texts and articles in different media.
- Write news reports and online writing in electronic/ print media.

Textbook

1. Durant, Alan & Marina Lambrou. **Language and Media: a resource book for students**. Routledge English Language Introduction. London: Routledge, 2009

Reference Books

1. Stovall, James Glen. **Writing for the Mass Media** (8th edition). London: Pearson, 2014.
2. Arnold, George T. **Media Writer's Handbook. A Guide to Common Writing and Editing Problems.** New Delhi: Tata McGraw Hill Education (India) Pvt Ltd, 2010.
3. Redish, Janice (Ginny). **Letting Go of the Words: Writing Web Content that Works.** London: Morgan Kaufmann / Elsevier, 2007.