**Master of Technology
(Electronics & Communication Engineering)**

Programme code: MTE

Duration – 2 years full Time

**Programme Structure
and
Curriculum & Scheme of Examination**

2017-19

AMITY UNIVERSITY
R A J A S T H A N

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

Components	Codes	Weightage (%)
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	70

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

July, 2011

Program Outcomes (POs)

ELECTRONICS AND COMMUNICATION ENGG.

PLO.1-An ability to apply and understand the knowledge of mathematics, science and engineering.

PL0.2-Knowledge and understanding of mathematics through differential and integral calculus, and basic sciences and engineering topics (including computing science) necessary to analyze and design complex electrical and electronic devices, software, and systems containing embedded hardware and software components and their design.

PLO.3-Develop and deploy engineering/technological solutions using latest techniques & tools/CAD (VHDL, MATLAB, Or-cad, VLSI, Antenna Design) imbibing concern for eco-system, and an attitude to serve society & humanity at large.

PLO.4-Graduates will successfully engage themselves in practice of multidisciplinary engineering or relevant fields; They will pursue wide-spectrum careers appropriately as technologists, innovators, consultants, managers & entrepreneurs and will advance in their profession.

PLO.5-An ability to design and conduct experiments as well as to analyze and interpret data.

PLO.6-An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, health and safety.

PLO7-An ability to identify, formulate, and solve engineering problems.

PLO8-Knowledge of probability and statistics, including applications appropriate to the electrical engineering (Electronics, Communication, Processing and Embedded technology)

PROGRAMME STRUCTURE

Curriculum & Scheme of Examination

ADVANCED DIGITAL COMMUNICATION

Course Code: **MTE 101**   **Credit Units: 04**

Course Objective:
The purpose of this course is to provide a thorough knowledge of advanced digital communications systems with in depth study of various digital modulation techniques, spread spectrum techniques, and information theory.

Course Contents:

Module I: Introduction
Geometric representation of modulation signals, Liner modulation technique, $\pi/4$ QPSK, Offset QPSK Constant envelop modulation technique, MSK, GMSK, Linear & constant envelop modulation techniques, M-ary PSK, M-ary QAM**.** Characterization of communication signals & system.

Module II: Spread spectrum analysis
Spread spectrum system like DS-Spread spectrum, Pseudo noise sequences, Performance of DS-SS, Frequency Hopping system, Modulation Error Performance for Binary signal in AWGN, Detection of M-ary orthogonal signals, and M-ary orthogonaling with non-coherent detection.

Module III: Signal design for band limited channel and Equalization
Design of band limited signals for no ISI and with controlled ISI, data detection for controlled ISI, Adaptive equalization, Linear Equalization, Nonlinear Equalization, decision feedback equalization, RAKE receiver, Maximum likelihood sequence estimation (MLSE) equalization.

Module IV: Digital communications through fading multi path channels
Characterization of fading multipath channels, effect of signal characteristics and the choice of channel model, frequency non selective and slowly fading channel, diversity techniques for fading multipath channels, digital signaling over a frequency selective and slowly fading channels, coded waveforms for fading channels, multiple antenna system.

Module V: Channel Capacity & Quantization
Channel model & channel capacity with orthogonal signals, random selection of codes based on M-ary binary coded signals & also on M-ary multi amplitude signal. Comparison of R0 with capacity of AWGN channel. Vector Quantization, Adaptive Quantization.

Module VI: Optimum receivers for the additive white Gaussian noise channel
Optimum receiver for signals corrupted by AWGN, Performance of the optimum receiver for memory less modulation, optimum receiver for CPM signal and for signals with random phase in AWGN channel, performance analysis for wire line and radio communication system.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References:

- John G.Proakis: Digital Communications.
- Bernard Sklar: Digital Communications.
- Simon Haykin: Communication System, Wiley eastern Ltd. Ed. 1998.
- J.Dassm S K Mullick & P K Chatterjee: Principle of Digital Communication, Wiley Eastern Ltd.
- Martin S. Roden: Digital and Data Communication System P.H.I London. Ed. 1998.
- Viterbi, A.I and J.K.Qmura: Principles of Digital Communication, McGraw Hill Company, New York.

AUDIO SIGNAL PROCESSING

Course Code: **MTE 102**   **Credit Units: 04**

Course Objective:
This course covers the concepts of audio signal processing and coding. It covers Psychoacoustic Principles, Time Frequency Analysis and Coding.

Course Contents:

Module I: Audio Signal Processing Essentials
Introduction, Spectra of Analog Signals, Review of Convolution and Filtering, Uniform Sampling, Discrete-Time Signal Processing, Transforms for Discrete-Time Signals, The Discrete and the Fast Fourier Transform, The Discrete Cosine Transform, The Short-Time Fourier Transform, Difference Equations and Digital Filters, The Transfer and the Frequency Response Functions, Poles, Zeros, and Frequency Response, Digital Filters for Audio Applications, Review of MultiMate Signal Processing, Down-sampling by an Integer, Up-sampling by an Integer, Sampling Rate Changes by Non-integer Factors,

Module II: Linear Prediction in Narrowband and Wideband Coding
LP-Based Source-System Modeling for Speech, Short-Term Linear Prediction, Long-Term Prediction, ADPCM Using Linear Prediction, Open-Loop Analysis-Synthesis Linear Prediction, Analysis-by-Synthesis Linear Prediction, Code-Excited Linear Prediction Algorithms, Linear Prediction in Wideband Coding, Wideband Speech Coding, Wideband Audio Coding,

Module III: Psychoacoustic Principles
Absolute Threshold of Hearing, Critical Bands, Simultaneous Masking, Masking Asymmetry, and the Spread of Masking, Noise-Masking-Tone, Tone-Masking-Noise, Noise-Masking-Noise, Asymmetry of Masking, Perceptual Entropy Example Codec Perceptual Model: ISO/IEC(MPEG - 1), Psychoacoustic Model, Spectral Analysis and SPL Normalization, Identification of Tonal and Noise Maskers, Decimation and Reorganization of Maskers, Calculation of Individual Masking Thresholds, Calculation of Global Masking Thresholds, Perceptual Bit Allocation.

Module IV: Time-Frequency Analysis: Filter Banks and Transforms
Analysis-Synthesis Framework for M-band Filter Banks, Filter Banks for Audio Coding: Design Considerations, The Role of Time-Frequency Resolution in Masking Power Estimation, The Role of Frequency Resolution in Perceptual Bit Allocation, The Role of Time Resolution in Perceptual Bit Allocation, Quadrature Mirror and Conjugate Quadrature Filters, Cosine Modulated Perfect Reconstruction (PR) M-band Banks and the Modified Discrete Cosine Transform (MDCT), Discrete Fourier and Discrete Cosine Transform, Pre-echo Distortion, Pre-echo Control Strategies.

Module V: Lossless Audio Coding
Lossless Audio Coding (L^2AC), L^2AC Principles, L^2AC Algorithms, DVD-Audio, Meridian Lossless Packing (MLP), Super-Audio CD (SACD), SACD Storage Format, Sigma-Delta Modulators (SDM), Direct Stream Digital (DSD) Encoding, Digital Audio Watermarking, Background, A Generic Architecture for DAW, DAW Schemes – Attributes, Commercial Applications.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Andreas Spanias, Ted Painter, Venkatraman Atti, Audio Signal Processing and Coding, John Wiley & Sons.
- Udo Zölzer, Digital Audio Signal Processing, John Wiley and Sons

STOCHASTIC METHODS

Course Code: MTE 103   **Credit Units: 04**

Course Objective:
This course deals with the comprehensive knowledge of Probability theory, probability distributions, transition probabilities, Markov Chains, birth and death processes, Network of queues, correlation and regression analysis and Analysis of variance.

Course Contents:

Module I: Random Variables
Probability Bay's rule, Distribution function, discrete random vectors, different distributions, jointly distributed random variables. Order statistics, Distribution of sums, expectations, moments, transform methods mean time to failure, Inequalities and limit theorems, Mixture distribution, Conditional expectations, Imperfect fault coverage & reliability, Random sums.

Module II: Stochastic Processes
Classification Bernoulli process, Poisson process, Renewal processes, available analysis, Random incidence, renewal model of program behavior.

Module III: Markov Chains
n-step transition probabilities, limiting distribution, distribution of times between state changes, irreducible finite chains with a periodic states, the m/g/I, queuing system discrete parameter, Birth Data Processes, Markov chains with absorbing states, Birth and death Processes, Non – Birth Death Processes.

Module IV: Network of Queues
Open and close queuing networks, Non exponential service item distributions and multiple job type, non product form networks. Correlation & Regression: Introduction, least squares curve fitting, Coefficient of determination, Confidence of intervals in linear regression, concatenation analysis, non linear regression, Analysis of variance.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References:

- Papoulis, A., Probability, Random Variables and Stochastic Processes, Third Edition, McGraw-Hill
- K.S.Trivedi: Probability and Statistics, PHI, 3rd Ed.
- S.P.Gupta, Statistical Methods, Sultan Chand Sons
- V.K. Kapoor and S. C. Gupta Fundamentals of Statistics, Sultan Chand and Sons.

ADVANCED DIGITAL COMMUNICATION LAB

Course Code: **MTE 121**   **Credit Units: 02**

Tailor Made Experiments:

- To study carrier modulation techniques using Amplitude shift keying.
- To study carrier modulation techniques using frequency shift keying.
- To study carrier modulation techniques using binary phase shift keying.
- To study data coding and decoding for NRZ format (NRZ L, M&S)
- To study data coding and decoding for phase encoding format (Biphase L, M&S).
- To study data coding and decoding for unipolar to bipolar and vice versa (RZ, AMI, URZ)
- To study delta modulation and demodulation.

Open Ended Experiments:

- To study slope overload and increased gain in Delta modulation.
- To study Quadrature phase shift keying.
- To study Quadrature Amplitude Modulation.
- To study voice modulation and demodulation
- To study Compander and Expander.
- To study Adaptive delta modulation and demodulation with CVSD.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

AUDIO SIGNAL PROCESSING LAB

Course Code: **MTE 122** **Credit Units: 02**

List of experiments:

1. Write a MATLAB program to load, display, and play back Audio files.
2. Handling Audio files in MATLAB.
   a. Read an audio file, its sampling rate and bits per sample.
   b. Write an audio file, at different sampling rates, at different bits per sample.
   c. Play an audio file at different sampling rates.
   d. Use of whos command to view the variables in the workspace.
3. Up-sampling and down-sampling of audio file and its effect in perceptual properties.
4. Fourier Transform and inverse Fourier Transform of Audio signals, plot of the spectrum of audio signals. Audio synthesis from a select number (subset) of FFT components.
5. For an audio signal, include a framing module in a program and set the frame size to 256 samples. Every frame should be read in a 256 × 1 real vector called. Compute the fast Fourier transform of this vector. Compute the magnitude of the complex vector S_{freq} and plot its magnitude in dB up to the fold-over frequency. This computation should be part of the frame-by-frame audio processing program.
6. Analysis of audio signals using Short-term Fourier Transform (STFT) in the Time-frequency domain.
7. Analysis of multi-resolution, wavelet decomposition and reconstruction of audio signals at different levels using different filters.
8. Write a program to plot the absolute threshold of hearing in quiet. Give a plot in terms of a linear Hz scale.
9. Power spectral density of different types of audio signals.
10. Insert and recover data from an audio signal using LSB coding method

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ADVANCED OPTICAL COMMUNICATION

Course Code: MTE 105   **Credit Units: 04**

Course Objective:
The objective of this course is to introduce the student to the fundamental basics and understanding of fiber optical communications. This includes the properties of optical fibers and how they are used to establish optical links for communication systems. The course also gives exposure of Advance Optical Communication use in present communications networks.

Course Contents:

Module I: Wave Propagation in Optical Fibers
Ray theory transmission in optical fiber, Electromagnetic mode theory for optical propagation, Modes in a planar guide, phase shift and Evanescent field, Goos-Haenchen Shift, Types of optical fibers, Intermodal dispersion.

Module II: Transmission characteristics and Attenuation in optical fibers
Losses in fiber, Intramodal and Intermodal dispersion, connectors &splices, bending loses, Absorption, scattering, low loss materials.

Module III: Optical sources & detectors
LED, double hetero junction structure, optical confinement and carrier confinement, Semiconductor injection laser, Single mode and multimode injection laser, buried hetero structure laser, transverse junction stripe laser, distributed feedback lasers, Semiconductor photodiodes with internal gains.

Module IV: Components and Design issues
Transmitter circuit, LED drive circuits, laser drive circuits, optical receiver circuit: pre-amplifier and AGC, Equalizations, Digital system design considerations: regenerative repeater, optical transmitter and optical receiver, temporal losses, Optical power budgeting, analog system planning, Pulse analog techniques.

Module V: Optical Networking
Optical TDM, subscriber multiplexing (SCM), WDM
Optical networking: data communication networks, network topologies, MAC protocols, Network Architecture-SONET/TDH, optical transport network, optical access network, optical premise network.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Senior J., optical fiber communications, principles & practice, PHI.
- Keiser G., optical fiber communications, McGraw-hill.
- Gowar J., optical communication systems, PHI.
- William B. Jones jr., Introduction to optical fiber communication systems, Holt, Rinehart and Winston, Inc.

LOW POWER VLSI DESIGN

Course Code: **MTE 104**   **Credit Units: 04**

Course Objective:
This course deals with the design issues of low power circuit in digital perspective. In this course, MOS transistor modeling is emphasized for low power applications. After completing this course the student have thorough knowledge of modeling of various MOS parameter and SPICE simulation for low power applications, correlation analysis in DSP systems, Monte Carlo simulation, low power memory design.

Course Contents:

Module I: Low Power VLSI Design Methodology: An overview
Need for low power VLSI design, sources of power dissipation in CMOS (S>C current, leakage current, static current), physics of power dissipation in CMOS devices, CMOS low voltage analytical model. CMOS power supply voltage scaling.

Module II: Principles of low power design
Sources of power dissipation, Impact of transistor sizing and oxide thickness, Technology & Device innovation.

Module III: Simulation Power analysis
SPICE circuit simulators, gate level logic simulation, capacitive power estimation, static state power, gate level capacitance estimation, architecture level analysis, data correlation analysis in DSP systems. Monte Carlo simulation.
Probabilistic power analysis: Random logic signals, probability & frequency, probabilistic power analysis techniques, signal entropy.

Module IV: Low Power Design
Circuit level: Power consumption in circuits. Flip Flops & Latches design, high capacitance nodes, low power digital cells library
Logic level: Gate reorganization, signal gating, logic encoding, state machine encoding, pre-computation logic.

Module V: Low power: Special Techniques
Power dissipation in clock distribution and reduction techniques, CMOS floating node, Low power bus, Switching activity reduction, Parallel architecture with voltage reduction, Flow graph transformation.
Adiabatic switching concepts, Multi threshold CMOS designing.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:
- Gary K. Yeap, "Practical Low Power Digital VLSI Design", KAP, 2002
- Rabaey, Pedram, "Low power design methodologies" Kluwer Academic, 1997

References:
- Kaushik Roy, Sharat Prasad, "Low-Power CMOS VLSI Circuit Design" Wiley, 2000

COMMUNICATION SKILLS – I

Course Code: BCS 111   **Credit Units: 01**

Course Objective:
The Course is designed to give an overview of the four broad categories of English Communication thereby enhance the learners' communicative competence.

Course Contents:

Module I: Listening Skills
Effective Listening: Principles and Barriers
Listening Comprehension on International Standards

Module II: Speaking Skills
Pronunciation and Accent
Reading excerpts from news dailies & magazines
Narrating Incident; Story telling.
Extempore & Role Plays

Module III: Reading Skills
Vocabulary: Synonyms, antonyms, diminutives, homonyms, homophones
Idioms & phrases
Foreign words in English

Module IV: Writing Skills
Writing Paragraphs
Précis Writing
Letter writing
Coherence and structure
Essay writing

Module V: Activities
News reading
Picture reading
Movie magic
Announcements

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Working in English, Jones, Cambridge
- Business Communication, Raman – Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge

BEHAVIOURAL SCIENCE - I
(SELF-DEVELOPMENT AND INTERPERSONAL SKILLS)

Course Code: **BSS 111**   **Credit Units: 01**

Course Objective:
This course aims at imparting an understanding of:
Self and the process of self exploration
Learning strategies for development of a healthy self esteem
Importance of attitudes and their effect on work behaviour
Effective management of emotions and building interpersonal competence.

Course Contents:

Module I: Understanding Self
Formation of self concept
Dimension of Self
Components of self
Self Competency

Module II: Self-Esteem: Sense of Worth
Meaning and Nature of Self Esteem
Characteristics of High and Low Self Esteem
Importance & need of Self Esteem
Self Esteem at work
Steps to enhance Self Esteem

Module III: Emotional Intelligence: Brain Power
Introduction to EI
Difference between IQ, EQ and SQ
Relevance of EI at workplace
Self assessment, analysis and action plan

Module IV: Managing Emotions and Building Interpersonal Competence
Need and importance of Emotions
Healthy and Unhealthy expression of emotions
Anger: Conceptualization and Cycle
Developing emotional and interpersonal competence
Self assessment, analysis and action plan

Module V: Leading Through Positive Attitude
Understanding Attitudes
Formation of Attitudes
Types of Attitudes
Effects of Attitude on
Behaviour
Perception
Motivation
Stress
Adjustment
Time Management
Effective Performance
Building Positive Attitude

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Towers, Marc: Self Esteem, 1st Edition 1997, American Media
- Pedler Mike, Burgoyne John, Boydell Tom, A Manager's Guide to Self-Development: Second edition, McGraw-Hill Book Company.
- Covey, R. Stephen: Seven habits of Highly Effective People, 1992 Edition, Simon & Schuster Ltd.,
- Khera Shiv: You Can Win, 1st Edition, 1999, Macmillan
- Gegax Tom, Winning in the Game of Life: 1st Edition, Harmony Books
- Chatterjee Debashish, Leading Consciously: 1998 1st Edition, Viva Books Pvt. Ltd.
- Dr. Dinkmeyer Don, Dr. Losoncy Lewis, The Skills of Encouragement: St. Lucie Press.
- Singh, Dalip, 2002, Emotional Intelligence at work; First Edition, Sage Publications.
- Goleman, Daniel: Emotional Intelligence, 1995 Edition, Bantam Books
- Goleman, Daniel: Working with E.I., 1998 Edition, Bantam Books.

FRENCH - I

Course Code: **FLF 111**   **Credit Units: 02**

Course Objective:
To familiarize the students with the French language
- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1,2
Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical: Unité 1: Découvrir la langue française: (oral et écrit)
1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance
1. donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences
2. Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3: Organiser son temps
1. dire la date et l'heure

Contenu grammatical:
1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation: Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif: réponses: oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN - I

Course Code: FLG 111   **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Introduction

Self introduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.

All personal pronouns in relation to the verbs taught so far.

Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),

Hallo, wie geht's?:   Danke gut!, sehr gut!, prima!, ausgezeichnet!,
                                    Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel

To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics

Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages

To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles

The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions

To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns

Simple possessive pronouns, the use of my, your, etc.

The family members, family Tree with the help of the verb "to have"

Module VIII: Colours

All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"

The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.

"Wie viel kostet das?"

Module X: Revision list of Question pronouns

W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – I

Course Code: **FLS 111**   **Credit Units: 02**

Course Objective:
To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other. How to present / introduce each other using basic verbs and vocabulary.

Course Contents:

Module I:
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II:
Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse* and practice of it.

Module III:
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV:
Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V:
Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

Module VI:
Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fr

CHINESE – I

Course Code: FLC 111   **Credit Units: 02**

Course Objective:
There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I:
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II:
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing' – sit, have tea ………….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III:
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV:
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.
Use of verb "zuo" and how to make sentences with it.

Module V:
Family structure and Relations.
Use of "you" – "mei you".
Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 1-10

- "Elementary Chinese Reader Part I" Lesson 1-10

TERM PAPER

Course Code: MTE 130   **Credit Units: 04**

Course Objective:

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER

The procedure for writing a term paper may consist of the following steps:
Choosing a subject
Finding sources of materials
Collecting the notes
Outlining the paper
Writing the first draft
Editing & preparing the final paper

1. **Choosing a Subject**
    The subject chosen should not be too general.
2. **Finding Sources of Materials**
    *   The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
    *   Begin by making a list of subject-headings under which you might expect the subject to be listed.
    *   The sources could be books and magazine articles, news stories, periodicals, scientific journals etc.
3. **Collecting the notes**
    Skim through sources, locating the useful material, then make good notes of it, including quotes and
    Information for footnotes.
    a)   Get facts, not just opinions. Compare the facts with author's conclusion.
    b)   In research studies, notice the methods and procedures, results & conclusions.
    c)   Check cross references.
4. **Outlining the paper**
    a)   Review notes to find main sub-divisions of the subject.
    b)   Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.
5. **Writing the first draft**
Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:
    1.   statement of purpose
    2.   main body of the paper
    3.   statement of summary and conclusion
Avoid short, bumpy sentences and long straggling sentences with more than one main idea.
6. **Editing & preparing the final Paper**
    Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
    Read the paper to ensure that the language is not awkward, and that it "flows" properly.
    Check for proper spelling, phrasing and sentence construction.
    Check for proper form on footnotes, quotes, and punctuation.
    Check to see that quotations serve one of the following purposes:
    a)   Show evidence of what an author has said.
    b)   Avoid misrepresentation through restatement.
    c)   Save unnecessary writing when ideas have been well expressed by the original author.
    Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.
    Term papers should be composed of the following sections:
    *   Title page
    *   Table of contents
    *   Introduction
    *   Review
    *   Discussion & Conclusion

- References
- Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion

The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion

The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:

summary of question posed

summary of findings

summary of main limitations of the study at hand

details of possibilities for related future research

Text & Reference:

From the very beginning of a research project, you should be careful to note all details of articles thered.

The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.

The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Conventions

Monographs

Crystal, D. (2001), Language and the internet. Cambridge: Cambridge University Press.

Edited volumes

Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter.

[(eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

Edited articles

Schmidt, R./Shimura, A./Wang, Z./Jeong, H. (1996), Suggestions to buy: Television commercials from the U.S., Japan, China, and Korea. In: Gass, S./Neu, J. (eds.) (1996), Speech acts across cultures. Challenges to communication in a second language. Berlin/ NY: Mouton de Gruyter: 285-316.

Journal articles

McQuarrie, E.F./Mick, D.G. (1992), On resonance: A critical pluralistic inquiry into advertising rhetoric. Journal of consumer research 19, 180-197.

Electronic book

Chandler, D. (1994), Semiotics for beginners [HTML document]. Retrieved [5.10.'01] From the World Wide Web, http://www.aber.ac.uk/media/Documents/S4B/.

Electronic journal articles

Watts, S. (2000) Teaching talk: Should students learn 'real German'? [HTML document]. German as a Foreign Language Journal [online] 1. Retrieved [12.09.'00] from the World Wide Web, http://www.gfl-journal.com/.

Other websites

Verterhus, S.A. (n.y.), Anglicisms in German car advertising. The problem of gender assignment [HTML document]. Retrieved [13.10.'01] from the World Wide Web, http://olaf.hiof.no/~sverrev/eng.html.

Unpublished papers

Takahashi, S./DuFon, M.A. (1989), Cross-linguistic influence in indirectness: The case of English directives performed by native Japanese speakers. Unpublished paper, Department of English as a Second Language, University of Hawai'i at Manoa, Honolulu.

sUnpublished theses/ dissertations

Möhl, S. (1996), Alltagssituationen im interkulturellen Vergleich: Realisierung von Kritik und Ablehnung im Deutschen und Englischen. Unpublished MA thesis, University of Hamburg.

Walsh, R. (1995), Language development and the year abroad: A study of oral grammatical accuracy amongst adult learners of German as a foreign language. Unpublished PhD dissertation, University College Dublin.

Appendix

The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:

Continuous Evaluation: 40%
(Based on abstract writing, interim draft, general approach,
research orientation, readings undertaken etc.)

Final Evaluation: 60%
(Based on the organization of the paper, objectives/
problem profile/ issue outlining, comprehensiveness of the
research, flow of the idea/ ideas, relevance of material used/
presented, outcomes vs. objectives, presentation/ viva etc.)

ADVANCED INFORMATION THEORY AND CODING

Course Code: MTE 201   **Credit Units: 04**

Course Objective:
This course introduces how various coding takes place in communication and what type of different codes are used in communication system. It also introduces different entropies, channel capacity and purpose of encoding.

Course Contents:

Module I: Fundamental Limits in Information Theory
Measure of Information, Data Compaction, Discrete Memory less Channels, Relationship among different Entropies, Mutual information, Channel Capacity, Capacity of channel with symmetric noise structure BSC and BEC, Channel Coding Theorem, Differential Entropy and Mutual Information for Continuous Ensembles, Information Capacity Theorem, Rate Distortion Theory.

Module II: Elements of Encoding
Source Coding: Instantaneous Codes, Source Coding Theorem, The Kraft Inequality and McMillan's Theorem, Average Length and Compact Codes, Shannon's Noiseless Coding Theorem, Fano Coding, Huffman Coding, Arithmetic Coding, Higher-order Modelling.
Fundamentals of Channel Coding: Code Rate, Decoding Rules, Hamming Distance, Bounds on M, Maximal Codes and Perfect Codes, Error Probabilities, Shannon's Fundamental Coding Theorem.

Module III: Introduction to Algebra
Groups, Ring, Vector space and Fields, Linear Spaces, Linear Spaces over Binary Fields, Construction of Galois field GF (2m), Basic Properties of Galois Field GF (2m), Codes Derived from Hadamard Matrices.

Module IV: Error Correcting Codes
Linear Block Codes: Introduction to Linear Block codes, Syndrome and Error detection, Minimum distance of block code, error detecting and Error correcting capability a block code.
Cyclic Codes: Rings of Polynomials, Description of Cyclic codes, Encoding and Decoding of Cyclic Codes and its Circuits, Goley Codes, Hamming Codes, Cyclic Redundancy Check Codes, Reed-Muller Codes.

Module V: Burst Correcting Codes
Finite Fields, Irreducible Polynomials, Construction of Finite Fields, Bursts of Errors, Fire Codes, Minimum Polynomials, Bose-Chaudhuri-Hocquenghem Codes, Other Fields, Reed-Solomon Codes.
Convolution Codes: Binary Convolution Codes, Decoding Convolution Codes, the Viterbi Algorithm, Sequential Decoding, Trellis Modulation, Turbo Codes

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- F.M. Reza: Information Theory, McGraw Hill
- ShuLin & J Costeib: Error Control Coding, (PHI)
- Dass, Mullick & Chatterjee : Digital Communication, John Wiley, Ed. 1992

COMPUTER COMMUNICATION AND NETWORKS

Course Code: MTE 202   **Credit Units: 04**

Course Objective:
This course gives a through understanding of the advanced concepts of Computer Network by giving in depth knowledge of protocols used at various layers of the references model. It also impart student with complete understanding of High speed communication and networking along with Network Security issues. The course also includes all important protocols and techniques used currently at various levels in communication and networking industry.

Course Contents:

Module I: Link Layer Protocols and Networks
Introduction to computer Networks: TCP/IP and OSI model. Design Issues for layers, Network topologies. Concepts of Physical Layer- Transmission media, Communication satellites, Mobile telephone System ; Data link layer -Error detection and correction, sliding window protocols, HDLC, PPP, ATM, Frame Relay, X.25.

Module II: Routing
Channel allocation problem, multiple access protocols: ALOHA, CSMA/CD, IEEE standard 802 for LAN and MAN, Bluetooth, Bridges, Transparent Bridging, Source Route Bridging. Types of Routing – Static, dynamic, shortest Path, Flooding, Link state, Distance Vector, Multicast. Routing protocols – OSPF, BGP, RIP, IGRP, EIGRP, and IGMP. Switching Techniques, Tag switching.

Module III: Internetworking Protocols
Internetworking, IPv6, Direct Enabled Networking. ARP, ICMP, UDP, TCP- Frame structure, Connection establishment, congestion control and connection release. Application Layer Protocols: HTTP, FTP, DNS, SMTP, SNMP, NLSP, Web caching, Content Distribution Networks.

Module IV: High Speed Networks and Multimedia Communication
Need of High Speed Networking and multimedia, Performance Attributes, FDDI, Fast Ethernet, RSVP, VLAN-Type of connections, Frame processing, Audio Compression, Video compression-VOD, MPEG formats, RTSP, RTP, RTCP, Scheduling and Policing Mechanisms. ISDN- BRI and PRI.

Module V: Network Security
Need for Network Security, Cryptography, Symmetric Key Algorithms- DES, AES, Public Key algorithms-RSA, Digital signatures- Public Key and Symmetric Key, Communication Security- IPsec, Firewalls, VPN, Wireless security, Authentication Protocols.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References:

Text:
- Tananbaum A.S., "Computer Networks", 3rd Ed, PHI, 1999.
- Laura Chappell (ed), "Introduction to Cisco Router Configuration", Techmedia, 1999.
- Computer Networking: A Top-Down Approach Featuring the Internet (3rd Edition) by James F. Kurose
- Data Communication & networking: Forouzan, B. A.

References:
- Black U., "Computer Networks-Protocols, Standards and Interfaces", PHI, 996.
- Stallings W., "Computer Communication Networks", PHI.
- Michael A. Miller, "Data & Network Communications", Vikas Publication.
- William A. Shay, "Understanding Data Communications & Networks".

ADVANCED MICROWAVE ENGINEERING

Course Code: MTE 203   **Credit Units: 04**

Course Objective:
This course provides comprehensive knowledge of microwave frequencies, microwave devices, microwave transmission lines, microwave passive and active circuits and measurements.

Course Contents:

Module I:
Characteristics features of microwaves, applications of microwaves, Maxwell's equations, plane wave in dielectric and conducting media, waveguide analysis, VSWR, and impedance, waveguide discontinuities. S-matrix representations, matrices of some typical microwave components such as attenuator, matched load, power divider, directional coupler, magic tee, Ferrite devices, wave propagation in ferrite medium, Faraday rotation, isolator, circulator.

Module II:
Microwave Transistor; Microwave Diode; MESFET, MOSFET mechanism, maximum operating frequency and microwave applications; HEMT; Charge Coupled Devices (CCD); Transferred Electron Devices: Gunn Diode, LSA Diode; Microwave Generation and Amplification; Avalanche Effect Devices: Read diode; IMPATT diodes.
Klystron: Velocity modulation process, bunching process, output power and beam loading; Reflex Klystron: power output and efficiency; Traveling Wave Tubes; Magnetron.

Module III:
Review of development and application of transmission lines; closed form models for the micro strip line; closed form models for the coplanar waveguide line Characteristics of coupled micro strip and coupled coplanar waveguide; Circuit models of discontinuities in micro strip lines and the coplanar waveguides: Micro strip line resonator; Micro strip patch resonators: rectangular, circular and ring.

Module IV:
Microwave Integrated Circuits (MIC), Technology of hybrid MICs. Design of MIC components: transitions, couplers, filters Power dividers, oscillators, modulators, phase shifters and amplifiers. Design of millimeter wave components: transitions, couplers, power dividers, filters, oscillators, switches, phase shifters and amplifiers.

Module V:
Microwave power measurements. Slotted line techniques for VSWR Measurement. Impedance Measurement. Measurement of scattering parameters using network analyzer. Frequency Measurements. Slotted line method and frequency meter. Measurement of Q for transmission type cavity.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & Reference:

- S.Y. Liao, "Microwave devices & Circuits", Prentice Hall of India, 3rd Ed. 1995.
- Edited by H.A. Watson, "Microwave Semiconductor devices and their circuit applications", McGraw Hill Book Co. New York 1969.
- K.C. Gupta, "Microstripline & Slot lines" Artech House.
- E.L. Giunzton, "Microwave Measurements", Mc Graw Hill Book Co. Inc. 1957.
- R. E. Colins: "Foundations for Microwave Engineering", John Wiley & Sons, Inc, 2005.

SEMICONDUCTOR DEVICE PHYSICS AND MODELING LAB
(USING SILVACO)

Course Code: **MTE 221**   **Credit Units: 02**

List of experiments :

1. Simulate 2-D fabrication of a Diode by B diffusion into an n-type substrate. Having doping profiles N_A=1e18 cm^{-3} and N_D=5e16 cm^{-3}. Also find the following-
    a. V-I characteristics of diode.
    b. Knee point (Cut in point).
    c. Sheet resistance
    d. Junction Depth

2. Uses a channel implant to shift the threshold voltage by 150mV (approx.). Analysis the effect of threshold lowering on leakages.

3. Draw the I-V characteristics of HBT for a doping concentration of 3e+14 cm$^{-3.}$

4. Design an optically controlled MOSFET with Gaussian doping of 5e+14 for a channel length of 50 nm. Measure all the respective parameters.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

COMPUTER COMMUNICATION AND NETWORKS LAB

Course Code: **MTE 222**   **Credit Units: 02**

List of Experiments:

Tailor made experiments
1. Study of Router Configuration in interface mode using packet tracer.
2. Study of CISCO switch 2960 series and setup VLAN.
3. To interconnect different network through routers.
4. To study and verify RIP Protocol.
5. To study and verify EIGRP protocol.
6. Socket Programming with JAVA.
7. Network Programming by using JAVA Program.
8. To study OSPF Protocol

Open ended experiments:
9. Implement the ALOHA protocol for packet communication between a number   of nodes connected to a common bus.
10. Implement the CSMA protocol for packet communication between a number of nodes connected to a common bus
11. To implement the token passing access in RING-LAN.
12. To study reliable data transfer between two nodes over an unreliable network using the stop and-wait protocol
13. Provide reliable data transfer between two nodes over an unreliable network using the sliding window go back N protocol.
14. Provide reliable data transfer between two nodes over an unreliable network using the sliding window selective repeat protocol.
15. To simulate the distance vector routing protocol to maintain routing tables as the traffic and topology of the network changes.
16. To simulate the link state routing protocol to maintain routing tables as the traffic and topology of the network changes.

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ADVANCED MICROWAVE ENGINEERING LAB

Course Code: **MTE 223**   **Credit Units: 02**

List of experiments :

To be decided

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

SATELITE COMMUNICATION

Course Code: MTE 204   **Credit Units: 04**

Course Objective:
The course aims to provide a detailed understanding about the orbital mechanics, link design, DBS System and various satellite networks.

Course Contents:

Module I: Orbital mechanics and Launchers
Orbital Mechanics look angle determination, orbital perturbation, orbit determination, launches and launch vehicles.
Satellite Subsystems, altitude and orbit control system, telemetry, tracking, and communication subsystem and satellite antennas

Module II: Satellite link design
System noise temperature and G/T ratio, design of downlinks and uplinks with examples, propagation effects and their impact on satellite earth links, rain and ice effects, attenuation.
Analog FM transmission by satellite, TV signals/N ratio for FM video Transmission, Digital transmission,

Module III: Satellite in networks and DBS television
ATM over satellite, satellite links and TCP, enhancing TCP over satellite channels, split TCP connections
C –band and Ku band home satellite TV, Orbital spacing, power rating and number of transponder, bit rates for digital television, MPEG compression standards, High definition TV, digital DBS TV,, Satellite radio broadcasting

Module IV: Low earth Orbit and non – geostationary satellite system
Orbit consideration, coverage and frequency consideration, frequency band elevation angle consideration, number of beams per coverage, off-axis scanning, optimal orbital altitude, Delay throughput, system consideration, Operational NGSO constellation designs, Ellipso, Globstar, Iridium, Orbcomm, GPS, Radarsat etc.

Module V: VSAT System
Network architectures, access control protocols, multiple access selection, signal formats, VSAT earth station engineering, calculation of link margins for a VSAT star network, System design procedure

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Satellite Communication - T. Pratt & C.W. Bostian and Jeremy Allnutt, John Wiley and Sons, 2003
- Satellite Communications – Dennis Roddy, TMH 2009
- Satellite Communication System Design Principles - M. Richharia
- Satellite Communication - R.M. Gagliardi

MEMS AND IC INTEGRATION

Course Code: MTE 205   **Credit Units: 04**

Course Objective:
This course gives the exposure of various techniques used in MEMS and IC Integration. RF and Optical MEMS are also covered.

Course Contents:

Module I:
Overview of CMOS process in IC fabrication, MEMS system-level design methodology.

Module II:
Equivalent Circuit representation of MEMS, signal-conditioning circuits, and sensor, noise calculation.

Module III:
Pressure sensors with embedded electronics (Analog/Mixed signal): Accelerometer with transducer. Gyroscope, RF MEMS switch with electronics, Bolo meter design

Module IV:
RF MEMS, and Optical MEMS MECS, thermo actuator MOEMS CILV, Digital
Micro mirror device Laser light.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Gregory T.A. Kovacs, Micro machined Transducers Sourcebook, The McGraw- Hill, Inc. 1998
- Stephen D. Senturia, Micro system Design, Kluar Publishers, 2001
- Nadim Maluf, An Introduction to Micro electro mechanical Systems Engineering, Artech House, 2000.
- M.H. Bao, Micro Mechanical Transducers, Volume 8, Handbook of Sensors and Actuators, Elsevier, 2000.
- Masood Tabib-Azar, Micro actuators, Kluwer, 1998.
- Ljubisa Ristic, Editor, Sensor Technology and Devices, Artech House, 1994
- D. S. Ballantine, et. al., Acoustic Wave Sensors, Academic Press, 1997
- H. J. De Los Santos, Introduction to Micro electro mechanical (MEM) Microwave Systems, Artech, 1999.
- James M. Gere and Stephen P. Timoshenko, Mechanics of Materials, 2nd Edition, Brooks/Cole Engineering Division, 1984

COMMUNICATION SKILLS - II

Course Code: **BCS 201**   **Credit Units: 01**

Course Objective:
To enrich the understanding of English language and communication, structure, style, usage, and vocabulary for global business purposes.

Course Contents:

Module I: Fundamentals of Communication
Role and purpose of communication: *7 C's of communication*
Barriers to effective communication
Enhancing listening
Forms of Communication: one-to-one, informal and formal

Module II: Verbal Communication (Written)
Business Letter
Social correspondence
Writing resume and Job applications

Module III: Speaking skills
Conversational English
Guidelines to give an effective presentation
Activities to include:
Presentations by students
Just a minute

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Textbook of Business Communication, Ramaswami S, Macmillan
- Speaking Personally, Porter-Ladousse, Cambridge

BEHAVIOURAL SCIENCE - II
(BEHAVIOURAL COMMUNICATION AND RELATIONSHIP MANAGEMENT)

Course Code: **BSS 201**   **Credit Units: 01**

Course Objective:
This course aims at imparting an understanding of:
Process of Behavioural communication
Aspects of interpersonal communication and relationship
Management of individual differences as important dimension of IPR

Course Contents:

Module I: Behavioral Communication
Scope of Behavioural Communication
Process – Personal, Impersonal and Interpersonal Communication
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication in relationship management

Module II: Managing Individual Differences in Relationships
Principles
Types of issues
Approaches
Understanding and importance of self disclosure
Guidelines for effective communication during conflicts

Module III: Communication Climate: Foundation of Interpersonal Relationships
Elements of satisfying relationships
Conforming and Disconfirming Communication
Culturally Relevant Communication
Guideline for Creating and Sustaining Healthy Climate

Module IV: Interpersonal Communication
Imperatives for Interpersonal Communication
Models – Linear, Interaction and Transaction
Patterns – Complementary, Symmetrical and Parallel
Types – Self and Other Oriented
Steps to improve Interpersonal Communication

Module V: Interpersonal Relationship Development
Relationship circle – Peer/ Colleague, Superior and Subordinate
Initiating and establishing IPR
Escalating, maintaining and terminating IPR
Direct and indirect strategies of terminating relationship
Model of ending relationship

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:
- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine, Naylor, Belinda: Effective Communication for Managers, 1997 1st Edition Cassell
- Harvard Business School, Effective Communication: United States of America

- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH - II

Course Code: **FLF 201**   **Credit Units: 02**

Course Objective:

- To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.
- To make them learn the basic rules of French Grammar.

Course Contents:

Module A: pp.38 – 47: Unité 3: Objectif 3, 4, 5. 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical:	Unité 3: Organiser son temps

Contenu lexical:

horaire

Unité 3: Organiser son temps

1.   donner/demander des informations sur un emploi du temps, un SNCF – Imaginer un dialogue
2.   rédiger un message/ une lettre pour …
   i) prendre un rendez-vous/ accepter et confirmer/ annuler
   ii) inviter/accepter/refuser
3.   Faire un programme d'activités
   imaginer une conversation téléphonique/un dialogue
   Propositions- interroger, répondre

Unité 4: Découvrir son environnement

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5: s'informer

1. demander/donner des informations sur un emploi du temps passé.
2.   donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifs démonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de:
   i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN – II

Course Code: **FLG 201**   **Credit Units: 02**

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany
Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods
Time and times of the day.
Weekdays, months, seasons.
Adverbs of time and time related prepositions

Module II: Irregular verbs
Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs
To comprehend the change in meaning that the verbs undergo when used as such
Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension
Reading and deciphering railway schedules/school time table
Usage of separable verbs in the above context

Module V: Accusative case
Accusative case with the relevant articles
Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns
Nominative and accusative in comparison
Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions
Accusative propositions with their use
Both theoretical and figurative use

Module VIII: Dialogues
Dialogue reading: 'In the market place'
                                  'At the Hotel'

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – II

Course Code: FLS 201   **Credit Units: 02**

Course Objective:
To enable students acquire more vocabulary, grammar, Verbal Phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I:
Revision of earlier modules.

Module II:
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III:
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs *(bueno/malo, muy, mucho, bastante, poco).*
Simple texts based on grammar and vocabulary done in earlier modules.

Module IV:
Possessive pronouns

Module V:
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE – II

Course Code: FLC 201   **Credit Units: 02**

Course Objective:
Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, "ma" with a third tone, it mean horse and "ma" with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I:
Drills
Practice reading aloud
Observe Picture and answer the question.
Tone practice.
Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns.
Measure words.
Glad to meet you.

Module II:
Where do you live?
Learning different colors.
Tones of "bu"
Buying things and how muchit costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.
Morning, Afternoon, Evening, Night.

Module III:
Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf,.. etc.
Description of room, house or hostel room.. eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression 'yao", "xiang" and "yaoshi" (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV:
Counting from 1-1000
Use of "chang-chang".
Making an Inquiry – What time is it now? Where is the Post Office?
Days of the week. Months in a year.
Use of Preposition – "zai", "gen".
Use of interrogative pronoun – "duoshao" and "ji".
"Whose"??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V:
The verb "qu"
Going to the library issuing a book from the library
Going to the cinema hall, buying tickets
Going to the post office, buying stamps
Going to the market to buy things.. etc
Going to the buy clothes …. Etc.
Hobby. I also like swimming.
Comprehension and answer questions based on it.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I" Lesson 11-20

PROJECT - I

Course Code: **MTE 260**   **Credit Units: 04**

Methodology:

The student will submit a synopsis at the beginning of the semester for the approval to the school project committee in a specified format. The student will have to present the progress of the work through seminars and progress report. A report must be submitted to the school for evaluation purpose at the end of the semester in a specified format.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
Total	**100**

RESEARCH METHODOLOGY

Course Code: MTE 301   **Credit Units: 04**

Course Objective:
The main objective of this course is how the data is gathered, or how the researcher came up with his information. The second objective of which is focused on the method of data analysis employed by the researcher. Informing your readers on how you obtained your results is a critical part of any research paper because this can provide your readers an assessment on how reliable or credible your information is. In this line, you must also state the logic on why you have decided to choose a particular method of data gathering.

Course Contents:

Module I: Research
Types, Research process and steps in it, Hypothesis, Research proposals and aspects. Research Design: Need, Problem Definition, variables, research design concepts, Literature survey and review, Research design process, Errors in research.
Research Modeling: Types of Models, Model building and stages, Data consideration and testing, Heuristic and Simulation modeling. Report Writing: Pre writing considerations, Thesis writing, Formats of report writing, formats of publications in Research journals.

Module II: Research Design
Concepts and Type of research design, Design of research of the basis of application – pure and applied, Design of research on the basis of Techniques / Methodology – Exploratory and Descriptive, Descriptive Research – Qualitative and Quantitative, Quantitative – Field studies, Field experiments and laboratory experiments, Design of research on the basis of area of research – research in Social sciences and Physical sciences, Sampling and Data collection, Population and samples, Techniques of sampling, Random, Stratified, Systematic, Multistage-sampling, Primary and secondary sources of data, Design of questionnaire'

Module III: Design of Experiments
Objectives, strategies, Factorial experimental design, Designing engineering experiments, basic principles-replication, randomization, blocking, Guidelines for design of experiments.
Single Factor Experiment: Hypothesis testing, Analysis of Variance components (ANOVA) for fixed effect model; Total, treatment and error of squares, Degrees of freedom, Confidence interval; ANOVA for random effects model, Estimation of variance
Components, Model adequacy checking.
Two factor Factorial Design, Basic definitions and principles, main effect and interaction, response surface and contour plots, General arrangement for a two factor factorial design; Models: Effects, means and regression, Hypothesis testing.

Module IV: Computer Applications
Spreadsheet Tool: Introduction to spreadsheet application, features and functions, Using formulas and functions, Data storing, Features for Statistical data analysis, Generating charts/ graph and other features. **Tools used may be Microsoft Excel, Open office or similar tool.**
Presentation Tool: Introduction to presentation tool, features and functions, Creating presentation, Customizing presentation, showing presentation. **Tools used may be Microsoft Power Point, Open Office or similar tool.**
Web Search: Introduction to Internet, Using advanced search techniques.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Text & References:

- Montgomery, Douglas C. (2007), 5/e, Design and Analysis of Experiments, (Wiley India)
- Montgomery, Douglas C. & Runger, George C. (2007), 3/e, Applied Statistics & Probability for Engineers (Wiley India)
- Kothari C.K. (2004), 2/e, Research Methodology- Methods and Techniques (New Age International, New Delhi)

- Krishnaswamy, K.N., Sivakumar, Appa Iyer and Mathiranjan M. (2006), Management Research Methodology; Integration of Principles, Methods and Techniques (Pearson Education, New Delhi)
- Fowler, F.J. Survey Research Methods. New Delhi, Sage, 1993 Kothari, C.R., (2008) Research Methodology", New Age International, Wishwa
- Publications, Delhi Reprint 2nd edition.
- Leddy, Paul. D Practical Research: Planning Design. London, Clive Bingley. 1980

ANTENNA THEORY AND DESIGN

Course Code: MTE 302   **Credit Units: 04**

Course Objective:

This course provides comprehensive knowledge about different antennas such as resonant antenna, array antenna, broad band antenna, aperture antenna and smart antenna. This describes antenna synthesis and different computational electromagnetic methods for antenna design.

Course Contents:

Module I:
Radiation mechanism - over view, near-and far-field regions, Electromagnetic Fundamentals, Solution of Maxwell's Equations for Radiation Problems, Ideal Dipole, Radiation Patterns, Directivity and Gain, Antenna Impedance, Radiation Efficiency. Antenna Polarization.

Module II: Resonant Antennas
Wires and Patches, Dipole antennas, Yagi - Uda Antennas, Micro strip Antenna.
Arrays: Array factor for linear arrays, uniformly excited, equally spaced Linear arrays, pattern multiplication, directivity of linear arrays, non- uniformly excited -equally spaced linear arrays, Mutual coupling, multidimensional arrays, phased arrays, feeding techniques, perspective on arrays.

Module III: Broad band Antennas
Traveling - wave antennas, helical antennas, Biconical antennas, sleave antennas, and Principles of frequency - independent Antennas, spiral antennas, and Log - Periodic Antennas.
Aperture Antennas: Techniques for evaluating Gain, reflector antennas - Parabolic reflector antenna principles, Axis - symmetric parabolic reflector antenna, offset parabolic reflectors, dual reflector antennas, Gain calculations for reflector antennas, feed antennas for reflectors, field representations, matching the feed to the reflector, general feed model, feed antennas used in practice.
Smart Antenna: Concept and benefits of smart antennas, fixed weight beam forming basics, Adaptive beam forming.

Module IV: Antenna Synthesis
Formulation of the synthesis problem, synthesis principles, line sources shaped beam synthesis, linear array shaped beam synthesis — Fourier Series, Woodward — Lawson sampling method, comparison of shaped beam synthesis methods, low side lobe narrow main beam synthesis methods Dolph Chebyshev linear array, Taylor line source method.

Module V: Method of Moments
Introduction to method of Moments, Pocklington's integral equation, integral equations and Kirchoff's Networking Equations, Source Modeling Weighted residuals formulations and computational consideration, calculation of antenna and scatter characteristics.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Stutzman and Thiele, "Antenna Theory and Design", 2ndEd, John Wiley and Sons Inc.
- C. A. Balanis: "Antenna Theory Analysis and Design", John Wiley, 2nd Edition, 2008.
- Kraus, "Antennas", McGraw Hill, TMH, 3" Edition, 2003
- Kraus and R.J. Marhefka:, "Antennas", McGraw Hill, 2nd Edition, 1998

IMAGE PROCESSING AND PATTERN RECOGNITION

Course Code: MTE 303   **Credit Units: 04**

Course Objective:
This course emphasizes general principles of image processing. Topics such as image enhancement, image restoration, image segmentation and multi resolution image analysis are covered. Some concepts of pattern recognition is introduced in this course.

Course Contents:

Module I: Image Enhancement and Restoration
Image Enhancement: Spatial Domain Methods: Arithmetic and logical operations, pixel or point operations, size operations, Histogram based image enhancement. Smoothing filters-Mean, Median, Mode filters, Comparative study, Sharpening filters – Directorial filters, Robert, Prewitt, Sobel, Laplacian, LOG filter. Frequency Domain Methods: Design of Low pass, High pass filters in Frequency Domain. Homomorphic filters. Image Restoration: Restoration Process, Noise Models, Restoration in Presence of Noise Only, Periodic Noise Reduction by Frequency Domain Filtering, Estimating the Degradation Function, Degradation model, Algebraic Approach to Restoration, Inverse filtering, Wiener filter, Constrained Least Square Restoration.

Module II: Wavelets and Multiresolution Processing
Background, Multiresolution Expansion, And Wavelet Transformation in One Dimension. Morphological Image Processing -Introduction, Erosion and Dilation, Opening And Closing, HIT or MISS Transformation, Basic Morphological Algorithms- Boundary Extraction, Hole Filling, Convex Hull, Thinning, Thickening, Pruning, Gray-Scale Morphology.

Module III: Image Segmentation
Fundamentals. Point, Line and Edge Detection, Thresholding-Foundation, Basic Global Thresholding, Multiple Thresholds, Variable Thresholding, Multivariable Thresholding, Region-Based Segmentation, Segmentation Using Morphological Watersheds.

Module IV: Introduction to Pattern Recognition
Elements of Image Analysis, Pattern and Pattern Classes, Introduction to pattern classification. Issues in classifier design, learning from examples. Classifiers based on Bayes Decision Theory: Examples of classifiers, nearest neighbour, 2-class Bayes classifier

Module V: Linear Classifiers
Linear discriminant functions for 2-class case, Perceptron algorithm and convergence proof. Linear least squares regression, pseudo inverse and LMS algorithm. Fisher linear discriminant, linear discriminant functions for multi class case.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing", Pearson Reprint, 2001.
- R. O. Duda, P. E. Hart, D. G. Stork, Pattern Classification, 2nd edition, John Wiley & Sons, Inc., 2000.
- Anil K. Jain, "Fundamentals of Digital Image Processing", Prentice-Hall of India, New Delhi, 2001.
- Image processing, Analysis, and Machine vision by Milan Sonka, Vaclav Hlavac Roger Boyle, Vikas Publishing House.
- S. Theodoridis, K. Koutroumbas, Pattern Recognition, 4th edition, Academic Press, 2009.

CDMA LAB USING QUALNET

Course Code:　　　**MTE 321**　　　　　　　　　　　**Credit Units: 02**

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

ADVANCED IMAGE PROCESSING LAB

Course Code: **MTE 322**   **Credit Units: 02**

Course Contents:

List of Experiments:

- Simulate all programs using MATLAB

- To study about the basic image processing tools.

- Write program for histogram processing.

- Write program for filtering in frequency domain.

- Write program for filtering in spatial domain.

- Write programs for different compression schemes.

- Write program image restoration.

- Write program for performing different morphological operations.

- Write program for image segmentation.

- Open ended experiment

Examination Scheme:

IA				EE	
A	**PR**	**LR**	**V**	**PR**	**V**
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

OPTIMIZATION TECHNIQUES

Course Code: **MTE 304**   **Credit Units: 04**

Course Objective:
In a fast changing environment an understanding is required which will provide facility to implement a problem for minimum cost, greater efficiency better customer service and higher quality. Optimization Techniques gives us help in solving such type of problems.

Course Contents:

Module I: Introduction to Optimization
Statement of an optimization problem, Classification of optimization problems, Optimization techniques, Engg. applications of optimization.

Module II: Classical Optimization Techniques
Single variable optimization, Multivariable optimization with no constraints, Multivariable optimization with equality constraints, Multivariable optimization with in equality constraints.

Module III: Linear Programming
Standard form of linear programming, Graphical solution, Simplex method, Two-phase simplex method, Computer implementation of the simplex method, Duality theory.

Module IV: Transportation Problem
North-West Corner rule, Least cost method, Vogel approximation method, testing for optimality.

Module V: Non-Linear Programming: One–dimensional minimization methods
Unimodal function, Dichotomous search, Fibonacci search, Quadratic interpolation method, Cubic interpolation method.

Module VI: Non-Linear Programming-Unconstrained Optimization Techniques
Random search method, steepest descent method, Conjugate gradient method, Variable metric method.

Module VII: Non-Linear Programming - Constrained Optimization Techniques
Interior Penalty function method, Exterior penalty function method.
Further Topics in Optimization
Critical path method (CPM), Program evaluation and review technique (PERT).

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	15	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- S.S. Rao, Optimization: Theory and applications, Wiley Eastern Ltd.
- G.V. Reklaitis, Engg. Optimization Methods & applications, Wiley.

PROJECT MANAGEMENT

Course Code: **MTE 305**   **Credit Units: 04**

Course Objective:

Project Management is a broad multi-level activity. The objectives of this course are to provide a thorough understanding of its various essentials to the student. At the completion of the course, the student should be able to apply criteria of selection for identification of a project and carry out a rational appraisal. He should be able to do project planning and be familiar with project control systems.

Course Contents:

Module I: Context of Project Management
Concept of Projects, Project Management, importance; Project Goals, Functions; Categories of Projects, Phases of Projects, 7S' of Projects; Life Cycles

Module II: Project Selection and Appraisal
Criteria for selection: Checklist Model, Scoring Model, Analytic Hierarchy Process, Profile Model; identification of the project; Request for Proposal; Project appraisal: Technical, Commercial, Economic, Financial and Management appraisal; Feasibility Study: Payback Period, NPV, IRR, Options Model; Detailed Project Report

Module III: Project Planning and Organization
Project Planning: Planning steps, Master plan; Defining Project Scope, Developing Work Breakdown Structure, Project Activity, Project Coordination, Scheduling Charts; Schedule, Gantt Charts, Project Team, Role of the leader; Project Organization: Pure, Matrix, Mixed; Project Portfolio Management

Module IV: Cost Estimation, Budgeting, Measurement of Risk
Cost Estimating Process, Budgets and Estimates; Cost-Time Overrun; Risk analysis, Project Management Information System

Module V: Project Review and Control
Control Process, Cybernetic controls, Go-No-go Controls, Post controls; Project Quality Control; Critical Chain Project Management; Project Closeout; Project Termination and Abandonment Analysis; Project Audit

Examination Scheme:

Components	CPA	TP	Q/S	A	ME	EE
Weightage (%)	5	5	5	5	10	70

Text & References:

- Gray & Larson (2008), Project Management, Tata McGraw-Hill
- Harvard Business School Press (2007), The Essentials of Project Management (for HR Professionals)
- Kerzner (2008), Project Management, John Wiley
- Kloppenborg (2009), Contemporary Project Management, Cengage.
- Maylor (2008), Project Management, Pearson India
- Meredith, Mantel, (2008), Project Management, Wiley India
- Nagarajan (2008), Project Management, New Age Publishers
- Nicholas and Steyn (2008), Project Management for Business, Engineering, & Technology, Elsevier India
- Pinto (2009),Project Management: Achieving Competitive Advantage, Pearson India, Delhi

COMMUNICATION SKILLS - III

Course Code: BCS 301   **Credit Units: 01**

Course Objective:
To initiate the learners with the basic mechanics of writing skills and facilitate them with the core skills required for communication in the professional world.

Course Contents:

Module I: Mechanics and Semantics of Sentences
Writing effective sentences
Style and Structure

Module II: Developing writing skills
Inter - office communication: Business Letter; E mails; Netiquette
Intra – office communication: Memos, Notices, Circulars, Minutes
Report Writing

Module III: Business Presentations
Planning, design and layout of presentation
Information Packaging
Audience analysis
Audio visual aids
Speaking with confidence
Case Studies

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.

BEHAVIOURAL SCIENCE - III
(LEADING THROUGH TEAMS)

Course Code: **BSS 301**   **Credit Units: 01**

Course Objective:
This course aims to enable students to:
Understand the concept and building of teams
Manage conflict and stress within team
Facilitate better team management and organizational effectiveness through universal human values.

Course Contents:

Module I: Teams: An Overview
Team Design Features: team vs. group
Effective Team Mission and Vision
Life Cycle of a Project Team
Rationale of a Team, Goal Analysis and Team Roles

Module II: Team & Sociometry
Patterns of Interaction in a Team
Sociometry: Method of studying attractions and repulsions in groups
Construction of sociogram for studying interpersonal relations in a Team

Module III: Team Building
Types and Development of Team Building
Stages of team growth
Team performance curve
Profiling your Team: Internal & External Dynamics
Team Strategies for organizational vision
Team communication

Module IV: Team Leadership & Conflict Management
Leadership styles in organizations
Self Authorized team leadership
Causes of team conflict
Conflict management strategies
Stress and Coping in teams

Module V: Global Teams and Universal Values
Management by values
Pragmatic spirituality in life and organization
Building global teams through universal human values
Learning based on project work on Scriptures like Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company

- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH - III

Course Code: **FLF 301**   **Credit Units: 02**

Course Objective:
To provide the students with the know-how
* To master the current social communication skills in oral and   in written.
* To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to103 Unité 7

Contenu lexical: **Unité 6: se faire plaisir**
1. acheter: exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiver ses relations
1. maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
2. annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
3. caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/personne/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

* le livre à suivre: Campus: Tome 1

GERMAN - III

Course Code: **FLG 301**   **Credit Units: 02**

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Modal verbs
Modal verbs with conjugations and usage
Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)
Information about Germany in the form of presentations or "Referat"– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case
Dative case, comparison with accusative case
Dative case with the relevant articles
Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns
Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions
Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues
In the Restaurant,
At the Tourist Information Office,
A telephone conversation

Module VII: Directions
Names of the directions
Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions
To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH – III

Course Code: FLS 301   **Credit Units: 02**

Course Objective:
To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Contents:

Module I:
Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb *Tener*, *Poner, Ir*….
Weather

Module II:
Introduction to *Gustar*…and all its forms. Revision of *Gustar* and usage of it

Module III:
Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV:
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V :
Reflexives

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras -Nivel Elemental

CHINESE – III

Course Code: **FLC 301**   **Credit Units: 02**

Course Objective:

Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I:
Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II:
Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between "hii" and "neng", "keyi".

Module III:
Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g.; fever, cold, stomach ache, head ache.
Use of the modal particle "le"
Making a telephone call
Use of "jiu" and "cal" (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

Module IV:
The ordinal number "di"
"Mei" the demonstrative pronoun e.g. mei tian, mei nian etc.
use of to enter to exit
Structural particle "de" (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.
Grammar use of "li" and "cong".
Comprehension reading followed by questions.

Module V:
Persuasion-Please don't smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates
Use of "it doesn't matter"
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- "Elementary Chinese Reader Part I, Part-2" Lesson 21-30

PROJECT - II

Course Code: MTE 360   **Credit Units: 06**

Course Objective:

The aim of the dissertation is to provide you with an opportunity to further your intellectual and personal development in your chosen field by undertaking a significant practical unit of activity, having an educational value at a level commensurate with the award of your degree.

The dissertation can be defined as a scholarly inquiry into a problem or issues, involving a systematic approach to gathering and analysis of information / data, leading to production of a structured report.

Selecting the Dissertation Topic

It is usual to give you some discretion in the choice of topic for the dissertation and the approach to be adopted. You will need to ensure that your dissertation is related to your field of specialization.

Deciding this is often the most difficult part of the dissertation process, and perhaps, you have been thinking of a topic for some time.

It is important to distinguish here between 'dissertation topic' and 'dissertation title'. The topic is the specific area that you wish to investigate. The title may not be decided until the dissertation has been written so as to reflect its content properly.

Few restrictions are placed on the choice of the topic. Normally we would expect it to be:
- relevant to business, defined broadly;
- related to one or more of the subjects or areas of study within the core program and specialisation stream;
- clearly focused so as to facilitate an in-depth approach, subject to the availability of adequate sources of information and to your own knowledge;
- of value and interest to you and your personal and professional development.

Planning the Dissertation

This will entail following:
- Selecting a topic for investigation.
- Establishing the precise focus of your study by deciding on the aims and objectives of the dissertation, or formulating questions to be investigated. Consider very carefully what is worth investigating and its feasibility.
- Drawing up initial dissertation outlines considering the aims and objectives of the dissertation. Workout various stages of dissertation
- Devising a timetable to ensure that all stages of dissertation are completed in time. The timetable should include writing of the dissertation and regular meetings with your dissertation guide.

The Dissertation plan or outline

It is recommended that you should have a dissertation plan to guide you right from the outset. Essentially, the dissertation plan is an outline of what you intend to do, chapter wise and therefore should reflect the aims and objectives of your dissertation.

There are several reasons for having a dissertation plan
- It provides a focus to your thoughts.
- It provides your faculty-guide with an opportunity, at an early stage of your work, to make constructive comments and help guide the direction of your research.
- The writing of a plan is the first formal stage of the writing process, and therefore helps build up your confidence.
- In many ways, the plan encourages you to come to terms with the reading, thinking and writing in a systematic and integrated way, with plenty of time left for changes.
- Finally, the dissertation plan generally provides a revision point in the development of your dissertation report in order to allow appropriate changes in the scope and even direction of your work as it progresses.

Keeping records

This includes the following:

- Making a note of everything you read; including those discarded.
- Ensuring that when recording sources, author's name and initials, date of publication, title, place of publication and publisher are included. (You may consider starting a card index or database from the outset). Making an accurate note of all quotations at the time you read them.

- Make clear what is a direct a direct quotation and what is your paraphrase.

Dissertation format
All students must follow the following rules in submitting their dissertation.
- Front page should provide title, author, Name of degree/diploma and the date of submission.
- Second page should be the table of contents giving page references for each chapter and section.
- The next page should be the table of appendices, graphs and tables giving titles and page references.
- Next to follow should be a synopsis or abstract of the dissertation (approximately 500 words)
- Next is the 'acknowledgements'.
- Chapter I should be a general introduction, giving the background to the dissertation, the objectives of the dissertation, the rationale for the dissertation, the plan, methodological issues and problems. The limitations of the dissertation should also be hinted in this chapter.
- Other chapters will constitute the body of the dissertation. The number of chapters and their sequence will usually vary depending on, among others, on a critical review of the previous relevant work relating to your major findings, a discussion of their implications, and conclusions, possibly with a suggestion of the direction of future research on the area.
- After this concluding chapter, you should give a list of all the references you have used. These should be cross - references with your text. For articles from journals, the following details are required e.g.

  Draper P and Pandyal K. 1991, The Investment Trust Discount Revisited, Journal of Business Finance and Accounting, Vol18, No6, Nov, pp 791-832.

  For books, the following details are required:
  Levi, M. 1996, International Financial Management, Prentice Hall, New York, 3rd Ed, 1996

Finally, you should give any appendices. These should only include relevant statistical data or material that cannot be fitted into the above categories.

The Layout Guidelines for the Dissertation
- A4 size Paper
Font: Arial (10 points) or Times New Roman (12 points)
Line spacing: 1.5
Top and bottom margins: 1 inch/ 2.5 cm; left and right margins: 1.25 inches/ 3 cm

Guidelines for the assessment of the Dissertation
While evaluating the dissertation, faculty guide will consider the following aspects:

1. Has the student made a clear statement of the objective or objective(s).
2. If there is more than one objective, do these constitute parts of a whole?
3. Has the student developed an appropriate analytical framework for addressing the problem at hand.
4. Is this based on up-to-date developments in the topic area?
5. Has the student collected information / data suitable to the frameworks?
6. Are the techniques employed by the student to analyze the data / information appropriate and relevant?
7. Has the student succeeded in drawing conclusion form the analysis?
8. Do the conclusions relate well to the objectives of the project?
9. Has the student been regular in his work?
10. Layout of the written report.

Assessment Scheme:

Continuous Evaluation:	40%
(Based on Abstract, Regularity,	
Adherence to initial plan, Records etc.)	
Final Evaluation: Based on,	60%
Contents & Layout of the Report,	20
Conceptual Framework,	05
Objectives & Methodology and	05
Implications & Conclusions	10
Viva & Presentation	20

SUMMER PROJECT

Course Code: **MTE 361**   **Credit Units: 04**

GUIDELINES FOR PROJECT FILE AND PROJECT REPORT
Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation. Research is genuine exploration of the unknown that leads to new knowledge which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critically analyzed by the faculty guide and corrected by the student at each stage.

PROJECT FILE
The Project File may be a very useful tool for undertaking an assignment along-with a normal semester, an exploratory study, sponsored projects, a project undertaken during summer period or any other period where the researcher is not working with a company/organization. The project/ assignment may also be a part of the bigger research agenda being pursued by a faculty/ institution/ department
The Project File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation. This file may be considered in continuous assessment.

In general, the File should be comprehensive and include:
A short account of the activities that were undertaken as part of the project;
A statement about the extent to which the project has achieved its stated objectives;
A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
Any problems that have arisen and may be useful to document for future reference.

PROJECT REPORT
The Project Report is the final research report that the student prepares on the project assigned to him. In case of sponsored project the lay out of the project could be as prescribed by the sponsoring organization. However, in other cases the following components should be included in the project report:

Title or Cover Page
The title page should contain Project Title; Student's Name; Programme; Year and Semester and Name of the Faculty Guide.

Acknowledgement(s)
Acknowledgment to any advisory or financial assistance received in the course of work may be given. It is incomplete without student's signature.

Abstract
A good "Abstract" should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to the objectives. The abstract does not have to be an entire summary of the project, but rather a concise summary of the scope and results of the project. It should not exceed more than 1000 words.

Table of Contents
Titles and subtitles are to correspond exactly with those in the text.

Introduction
Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

Materials and Methods
This section should aim at experimental designs, materials used (wherever applicable). Methodology should be mentioned in details including modifications undertaken, if any. It includes organization site(s), sample, instruments used with its validation, procedures followed and precautions.

Results and Discussion

Present results, discuss and compare these with those from other workers, etc. In writing this section, emphasis should be laid on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.

Note that in writing the various secions, all figures and tables should as far as possible be next to the associated text, in the same orientation as the main text, numbered, and given appropriate titles or captions. All major equations should also be numbered and unless it is really necessary, do not write in "point" form.

While presenting the results, write at length about the the various statistical tools used in the data interpretation. The result interpretation should be simple but full of data and statistical analysis. This data interpretation should be in congruence with the written objectives and the inferences should be drawn on data and not on impression. Avoid writing straight forward conclusion rather, it should lead to generalization of data on the chosen sample.

Results and its discussion should be supporting/contradicting with the previous research work in the given area. Usually one should not use more than two researches in either case of supporing or contradicting the present case of research.

Conclusion(s) & Recommendations

A conclusion should be the final section in which the outcome of the work is mentioned briefly.
Check that your work answers the following questions:
- Did the research project meet its aims (check back to introduction for stated aims)?
- What are the main findings of the research?
- Are there any recommendations?
- Do you have any conclusion on the research process itself?

Implications for Future Research

This should bring out further prospects for the study either thrown open by the present work or with the purpose of making it more comprehensive.

Appendices

The Appendices contain material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

References

References should include papers, books etc. referred to in the body of the report. These should be written in the alphabetical order of the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples

For research article

Voravuthikunchai SP, Lortheeranuwat A, Ninrprom T, Popaya W, Pongpaichit S, Supawita T. (2002) Antibacterial activity of Thai medicinal plants against enterohaemorrhagic *Escherichia coli* O157: H7. *Clin Microbiol Infect*, **8** (suppl 1): 116–117.

For book

Kowalski,M.(1976) Transduction of effectiveness in *Rhizobium meliloti*. SYMBIOTIC NITROGEN FIXATION PLANTS (editor P.S. Nutman IBP), **7**: 63-67

The Layout Guidelines for the Project File & Project Report
- A4 size Paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top and bottom margins: 1 inch/ 2.5 cm; left and right margins: 1.25 inches/ 3 cm

ASSESSMENT OF THE PROJECT FILE AND THE PROJECT REPORT

Essentially, the assessment will be based on the quality of the report, the technical merit of the project and the project execution. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project. Project execution is concerned with assessing how much work has been put in.

The Project should fulfill the following *assessment objectives*

- Range of Research Methods used to obtain information

- Execution of Research
- Data Analysis (Analyze Quantitative/ Qualitative information)
- Quality Control
- Conclusions

Assessment Scheme:

Continuous Evaluation: 40% (Based on punctuality, regularity of work, adherence to plan and methodology, refinements/ mid-course corrections etc. as reflected in the Project File.)

Final Evaluation: 60% (Based on the Documentation in the file, Final report layout, analysis and results, achievement of objectives, presentation/ viva)

INDUSTRIAL TRAINING WITH PROGRESS REPORT AND COMPREHENSIVE VIVA

Course Code: **MTE 450**   **Credit Units: 30**

1. Dissertation
2. Seminar & Progress Report
3. Comprehensive Viva

Practical training is based on the theoretical subjects studied by students. It can be arranged within the college or in any related industrial unit. The students are to learn various industrial, technical and administrative processes followed in the industry. In case of on-campus training the students will be given specific task of fabrication/assembly/testing/analysis. On completion of the practical training the students are to present a report covering various aspects learnt by them and give a presentation on same.

Examination Scheme:

Feedback from industry/work place	20
Training Report	40
Viva	15
Presentation	25
TOTAL	**100**