LN 104

Essential Professional Communication

w.e.f Session 2015-2016

Offered to students of: BBA (Sem. I), B.Com., BCA (Sem. I) B.Sc. (Industrial Chemistry), B.Sc.(PMC/PME), B. Pharma (Sem.I).

UNIT I: Professional Communication

Professional Communication: Its meaning & importance, Essentials of Effective Communication, Barriers to Effective Communication, The Cross Cultural Dimensions of Professional Communication

UNIT II: Language through Literature

A. Essays
   “The Effect of the Scientific Temper on Man” by Bertrand Russell
   “The Aims of Science and Humanities” by Moody E. Prior

B. Short Stories
   “The Meeting Pool” by Ruskin Bond
   “The Portrait of a Lady” by Khushwant Singh

UNIT III: Basic Vocabulary

Euphemism, One-word Substitution, Synonyms, Antonyms, Homophones, Idioms and Phrases, Common mistakes, Confusable words and expressions, Portmanteau words, Foreign words and expressions.

UNIT IV: Basic Grammar

Articles, Prepositions, Tenses, Concord (Subject-Verb agreement), Modal Auxiliaries, Verbs: its Kind & Uses, Degrees of Comparison, Punctuation.

UNIT V: Basic Composition

UNIT I: CONSERVATION LAWS
Inertial reference frame, Newton’s laws of motion, Dynamics of particle in rectilinear and circular motion, Conservative and Non-conservative forces, Conservation of energy, linear momentum and angular momentum, Collision in one and two dimensions, cross section. (8)

UNIT II: ROTATIONAL MOTION
Rotational energy and rotational inertia for simple bodies, the combined translation and rotational and motion of a rigid body on horizontal and inclined planes, Simple treatment of the motions of a top, Relations between elastic constants, bending of Beams and Torsion of Cylinder. (8)

UNIT III: GRAVITATION
Law of gravitation, gravitational field and potential, gravitational potential energy, gravitational field intensity, central forces, two particle central force problem, reduced mass, relative and centre of mass motion, Law of gravitation, Kepler’s laws, motions of planets and satellites, geo-stationary satellites. (8)

UNIT IV: OSCILLATIONS
Simple harmonic motion, differential equation of S. H. M. and its solution, some examples (mass-spring, simple pendulum, and compound pendulum), Damped Oscillator: Equation of motion and its solution, Forced oscillations and resonance: Solution of differential equation of a forced oscillator and variation of amplitude with frequency and damping. (8)

UNIT V: WAVE MOTION
Classification of waves, expression for a plane progressive and transverse harmonic wave, particle velocity and acceleration, path difference and phase difference, velocity of transverse waves in a string, differential equation of wave motion, plane progressive waves in fluid media, reflection of waves, phase change on reflection, superposition, stationary waves, pressure and energy distribution, phase and group velocity. (8)

Recommended Books
4. D.S, Mathur “Mechanics”.
Integral University, Lucknow  
Faculty of science  
B.Sc. (Physics, Mathematics, Computer Science), 1st Year/1st Semester  
Subject Name: Fundamentals of Computers  
Subject Code: CS114  
w.e.f. July-2016  

UNIT 1  
Introduction to Computers  

UNIT 2  
Binary number & Logic Gates  
Addition, subtraction, multiplication and division, Is complement, 2's complement, 9's complement, 10's complement. Logic Gates – Inverter, OR, AND, NOR, NAND, Exclusive OR, Exclusive AND, Universal gate  

UNIT 3  
Boolean algebra  
Definition, Boolean operation and expression, laws and rules of Boolean algebra, Demorgan’s theorems. Constructing a truth table for logic gates and circuits, simplification circuits using Boolean algebra.  

UNIT 4  
K-MAP & Flip Flops  

UNIT 5  
Multiplexer & Registers  
Multiplexer, DeMultiplexer, Encoder, Decoder and their Applications. Registers – types of shift registers and types of Counters.  

References:  
1. Introduction to computers – Norton – McGraw Hill  
2. computer fundamentals – B.Ram – New Age International  
3. Digital fundamentals – Floyd & Jain – Pearson Education  
4. computer fundamentals – jaggi and jain  
5. Digital logic and computer design – morris mano - PHI
INTEGRAL UNIVERSITY, LUCKNOW
FACULTY OF SCIENCE
B.Sc. (PMC/PME)
1 SEMESTER

Subject: Algebra and Trigonometry

Subject Code: MT121
LTP
310

(w.e.f. session 2016-2017)

Unit - I. 8
Matrix: Symmetric, Skew-symmetric, Hermitian and skew-Hermitian, Elementary operations,
Rank of Matrix, Linear independence of row and columns matrices, consistency and
inconsistency of linear equations, characteristic equations, eigen values and eigen vectors, Cayley
Hamilton theorem and applications.

Unit - II. 8
Relation between roots and coefficient of general polynomial equation in one variable,
transformation of equations, Descarte rule of sign, solution of cubic (Cardon Method),
biquadratic equations.

Unit - III. 8
Binary operations, algebraic structures, Definition of a group with examples and simple
properties, subgroups, cyclic groups, Permutation groups

Unit - IV: 8
Lagrange’s theorem and its consequences. Homomorphism and isomorphism, Normal
subgroups, Introduction to ring

Unit - V. 8
Complex functions and separation into real and imaginary parts, Exponential,
direct and inverse trigonometric and hyperbolic functions, logarithmic function, Gregory’s
series, Summation of series.

Books Recommended:

5. Text Book on Algebra & theory of equations; Chandrika Prasad, Pothishala Private Ltd.,
Allahabad.
Unit-I.
$\varepsilon-\delta$ definition of the limit of a function, Continuous functions and classification of discontinuities, Differentiability, Chain rule of differentiability, Rolle’s theorem, First and second mean value theorems, Taylor’s theorems with Lagrange’s and Cauchy’s forms of remainder, Successive differentiation and Leibnitz’s theorem.

Unit-II.
Expansion of functions (in Taylor’s and Maclaurin’s series), Indeterminate forms, Partial differentiation and Euler’s theorem, Jacobians.

Unit-III.
Maxima and Minima (for functions of two variables), Tangents and normals (polar form only), Curvature, Envelopes and evolutes.

Unit-IV
Asymptotes, Tests for concavity and convexity, Points of inflexion, Multiple points, Tracing of curves in Cartesian and polar co-ordinates. Integral Calculus Reduction formulae, Beta and Gamma functions.

Unit-V.
Quadrature, Rectification, Volumes and surfaces of solids of revolution, Pappus theorem, Double and triple integrals, Change of order of integration, Dirichlet’s and Liouville’s integral formulae.

Books recommended:

1. Gabriel Kiambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York,
Year: I, Semester I  
Subject: Mechanics Lab  

(1) Determination of Modulus of Rigidity of the material by Statistical method.  
(2) Determination of Young's Modulus of the Material by Flexure Method.  
(3) Determination of Coefficient of Viscosity of Water.  
(4) Determination of Surface Tension of Water.  
(5) Determination of Acceleration due to gravity by Compound Pendulum  
(6) Determination of frequency of A. C. Mains with the help of sonometer.  
(7) Measurement of height of a tower with a sextant.  
(8) Study of oscillations of mass under different combination of springs.  
(9) To find the capacity of a condenser with electrical vibrator using A. C. supply of 50 Hertz.  
(10) To study of moment of inertia of a body with the help of inertia table.
PART 1 - MS WORD
Shading, Table-Creation, Adding rows & columns, splitting & combining cells, Headers & Footers,
Inserting pictures, graphs, chart, word Art, find & Replace, Page setup.
Mail Merge:
Creating of main documents & data source, Adding & Removing fields from data source.
Exercise:
• Make a file using Bold, italics, and underline
• Set alignments (Left, right, & Center)
• Creating a file and use format painter
• Insert a table in a file and apply bullets and numbers in row and columns.
• Insert header and footer in a document, alignment of text in header and footer and insert a logo, page number of page and date.
• Apply water mark (text) in a document.
• Apply border and shading in page.
• Apply superscript and subscript wherever required in the document.
• Insert picture and text in text box.
• Create a diagram or organization chart in document.
• Save an existing file with a different name and different location.
• Create a document and set line spacing.
• Write a letter for inviting 100 people using mail merge with minimum 4 fields (Name, Address, phone number, e-mail ID)
• Add one more field of your choice and remove the address field
• Rename phone number field with contact number
• Create a file using word ART
• Create a document and insert a graph and chart in it.
• Set page margin (left, right, bottom) of 1 inch and set gutter margin.
• Show the use of grouping option
PART 2: MS-Excel
Cell, worksheet, work-book, cell entering-text value, formulae, insertion and deletion of row, column, and worksheet, auto sum tool, cell referencing function –sum, average, max, mim, count,
suif, countif, if, vlookup.
Exercise:
• Insert a new worksheet in an existing worksheet and also rename worksheet.
• Set the width of column and rows
• Merge cells.
• Sort the data in alphabetical manner
• Filter the data accordingly
• Create a mark sheet and apply conditional formatting in it.
• Apply validation to a selected area.
• Set margins of excel sheet using print preview option.
• Creating mark sheet using print sum, if and if function.
• Calculate mean of total marks in the marks sheet.
• Set the data in the manner that it shows two figures after decimal using round function.
• Insert comment on specific cell using comment option
• Using MOD function separate odd and even figures
• Find the maximum and minimum value in the worksheet.
• Find the value which are more that a given limit using countif function.
• Apply data on every page using DATE function.
• Show the use of Vlookup function in the existing data.
• Show the changes occurred in the adjacent cell when goal seek function is used.
• Draw a pie and bar chart according to given data.
• Sum the column by using autosum tool

PART 3: MS-PowerPoint
Creating presentation, adding slide, applying design templates, Master Slide, Adding special effects

Exercise:
• Creating a power point presentation of 5 slides using custom animation.
• Insert 2 slides in the existing presentation and change their background color.
• Insert a chart and a picture in second slide
• Show the use of master slide and duplicate slide.
• Prepare a slide showing slide transition.
• Insert a movie clip in a slide.
• Prepare 10 slides each having different design
• Unloop the slide show.

PART 4: INTERNET
Web browsing, E-mailing

Exercise:
• Creating an Email ID
• Gather the information on a given topic using search engine (Google)
• Changing IP address of a computer
• Show the use of internet search tool.
• Compress and decompress file and folders.

PART 5: MULTIMEDIA: 07
Text, Graphics, Animation, Audio, Video
Integral University
Department of Environmental Science
Subject Name: Fundamentals of Environmental Science
Subject Code: ES-115
For B.Sc. (BT), B.Sc. (Life Science), B.Sc. (PMO), B.Sc. (PME)
w.e.f. July, 2016

Unit-I (10 hr)
Environment its components & Segments, Physical, Chemical and biological study of Environment, Multidisciplinary nature of Environmental studies, Concept of sustainable development & Sustainable life styles. Public awareness & Environmental movements like Chipko, Silent valley, Narmada Bachao Andolan.

Natural resources:
Renewable and non-renewable resources: Natural resources and associated problems.
  a. Forest Resources: Use and over exploitation, deforestation, case studies.
  b. Water Resources: Use and over utilization of surface and ground water, conflicts over water, dams-benefits and problems.
  c. Mineral Resources: Use and exploitation, environmental effects of extracting and using minerals resources, case studies.
  d. Food Resources: World food problems, effects of modern agriculture, fertilizer -pesticide problems, Water-logging, Salinity, case studies.
  e. Energy Resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources, case studies.
  f. Land Resources: Land degradation, Soil erosion and desertification. Role of an individual in conservation of natural resources

Unit-II (8 hr)
Ecosystems
  • Concept of an Ecosystem.
  • Structure and Function of an Ecosystem.
  • Producer Consumer and decomposers.
  • Energy flow in the Ecosystem.
  • Ecological Succession.
  • Food chains, Food webs and Ecological Pyramids.
  • Introduction, types, characteristics features ,structure and function of the following ecosystem:
    a- Terrestrial Ecosystem
    b- Aquatic Ecosystem

Unit-III (8 hr)
Biodiversity and its conservation
  • Introduction - Definition: Genetic, Species and Ecosystem diversity.
  • Bio-Geographical classification of India,
  • Value of Bio-diversity: Consumptive use, productive use, Social, ethical, aesthetic and option values
• Biodiversity at Global, National & Local levels.
• India as a Mega Diversity Nation.
• Hotspots of Biodiversity
• Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts
• Endangered and endemic species of India
• Conservation of Biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit-IV
Environmental Pollution
Definition
• Causes, effects and control measures of
  a) Air Pollution
  b) Water Pollution
  c) Soil Pollution
  d) Noise Pollution
• Solid Waste Management: Causes, effects and control measures of urban and Industrial Wastes.
• Disaster Management: floods, earthquake, cyclones and landslides.

Unit-V
Social Issues and the Environment
• From unsustainable development to sustainable development
• Urban problems related to Energy
• Water conservation, Rain water Harvesting, Watershed management
• Resettlement and Rehabilitation of people: its problems and concerns, case studies.
• Environmental ethics: issues and possible solutions
• Green house effect and global Warming, effects of acid Rain and their remedial measures and ozone Layer depletion.
• Ill-effects of fire works

Human Population and the Environment
• Population growth variation among nations, Population Explosion, Family welfare programme,
• Environment and Human Health,
• Value education
• HIV/AIDS, Women and Child welfare

Suggested field work
Visit to local area to document environment assets river/ forest/ grassland/ hill/mountain, visit to local polluted site urban/ rural/ industrial/ agricultural, study of common plants, insects, birds, study of simple ecosystems pond river, hill slopes etc.
Recommended Books:
7. Down to Earth, Centre for Science and Environment(R).
14. Miller T.G. Jr, Environmentalrts Ecology, W. B. Saunders Co.USA,574 p. 16
Year: I, Semester: II
Subject: Physical Optics and Lasers
Code: PY108
L T P
3 1 0

UNIT-I Geometrical Optics and Nature of Light

UNIT II: Interference of a light
The principle of superposition, two-slit interference, coherence requirement for the sources, optical path retardations, lateral shift of fringe; thin films, applications for precision measurements for displacements, Haidinger fringes: Fringes of equal inclination, Michelson interferometer, its application for precisional determination of wavelength, wavelength difference, Newton's rings, Fabry-Perrot interferometer and etalon. (8)

UNIT - III Diffraction:
Fresnel half-period zones, plates, straight edge, rectilinear propagation, Fraunhofer diffraction: Diffraction at a slit, half-period zones, the intensity distribution, diffraction at a circular aperture and a circular disc, resolution of images, Rayleigh criterion, resolving power of telescope and microscopic systems, Diffraction gratings: Diffraction at N parallel slits, intensity distribution, plane diffraction grating, reflection grating, Resolving power of a grating and comparison with resolving powers of prism. (8)

UNIT - IV Polarization
Double refraction in uniaxial crystals, Nicol prism, polaroids and retardation plates, Babinet's compensator, Analysis of polarised light, Optical activity and Fresnel's explanation, Half shade and Biquartz polarimeters, Matrix representation of plane polarized waves, matrices for polarizers, retardation plates and rotators. (8)

UNIT - V Lasers
Purity of a special line, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients, spontaneous and induced emissions, conditions for laser action, population inversion, 3 and 4 Level Systems (Ruby, Nd: YAG, CO2, liquid dye and He-Ne laser), Properties and applications of laser. (8)

Recommended Books
3. F Smith and JH Thomson; “Manchester Physics Sries; Optics” (English Language Book Society and Joh Wiley, 1977).
4. Born and Wolf; “Optics”
7. Smith and Thomson; “Optics” (John Wiley and Sons).
8. B.B. Lau; “Lasers” (New Age).
Integral University, Lucknow  
Faculty of Science  
B.Sc. (Physics, Mathematics, Computer Science), 1st Year/IIrd Semester  
Subject Name: Programming in C  
w.e.f. July-2016

UNIT 1  
An Overview of C  
Character set. Variables and Identifiers, Built-in data types. Variable definition, Arithmetic operators and Expressions, Constants and Literals, simple assignment statement, basic input/output statement, Simple 'c' programs.

Decision making and Looping  
Decision making within a program, Conditions, Relational operators, Logical connectives, if statement, if-else statement, loops: while loop, do while, for loop. Nested loops, infinite loops, switch statement, Structured programming

UNIT 2  
Arrays  
One dimensional arrays: Array manipulation; searching, insertion, deletion of an element from an array; finding the largest/smallest element in an array; two dimensional arrays, addition/multiplication of two matrices, Transpose of a square matrix; Representation sparse matrices.

UNIT 3  
Functions  
Top-down approach of problem solving, Modular programming and functions, Standard library of c functions, Prototype of a function: return type, function call, block structure, passing arguments to a function: call by reference, call by value, recursive functions, arrays as function arguments.

UNIT 4  
Structure and Unions  
Structure variables, initialization, Structure assignment, nested structure, Structures and Functions, Structures and arrays: Arrays of structures, Structures containing arrays, Unions.

UNIT 5  
Pointers  
Address operators, Pointer type declaration, Pointer assignment, Pointer initialization, Pointer arithmetic, Functions and Pointers, Arrays and Pointers, Pointer arrays.

References:  
1. Let us 'C' by 'Yashwant Kanitkar'-BPB Publication.  
2. Programming in 'C' by 'E Balagurusamy'-TMH Publication.  
3. Programming in C, by Lipschutz, OUTLINES.
INTEGRAL UNIVERSITY, LUCKNOW
FACULTY OF SCIENCE
B.Sc. (PMC/PME)
II SEMESTER

Subject: Vector Analysis & Geometry
Subject Code: MT123
LTP
310

(w.e.f. session 2016-2017)

Unit -I.
8

Unit-II .
8
Vector integration. Line integral, Surface integral, Volume integral, Gauss divergence theorem, Stokes theorem, Greens theorem, Problems based on these theorems.

Unit -III.
8

Unit- IV:
8
Straight Line: Introduction, Various forms of the equations of a line Plane: Introduction, particular planes, various forms of the equations of a plane, Sphere, Cone ,Cylinder

Unit-V.
8
Central Conicoids, Paraboliods, Plane sections of conicoids, reduction of second degree equations

Books recommended:
7. P.K.Jain & Khalil Ahmad, A Text Book of two dimensions, Wiley Eastern Ltd.
8. P.K.Jain & Khalil Ahmad, A Text Book of three dimensions, Wiley Eastern Ltd.
Subject: Differential Equations
Subject Code: MT124
LTP 310
(w.e.f. session 2016-2017)

Unit 1
Formation of a differential equation (D.E.), Degree, order and solution of a D.E.,
Equations of first order and first degree : Separation of variables method, Solution
of homogeneous equations, linear equations and exact equations, Linear differential
equations with constant coefficients, Homogeneous linear differential equations.

Unit 2.
Differential equations of the first order but not of the first degree, Clairaut’s
equations and singular solutions, Simultaneous linear differential
equations, Linear differential equations of the second order (including the method of variation of
parameters),

Unit-3
Partial differential equations, Order, Method of forming Partial Differential Equations, Solution
of Equations by Direct Integration, First order Linear Partial Differential Equations, Lagrange’s
Method , First order non linear Partial differential equations, Charpit’s method.

Unit-4
Classification of linear partial differential equations of second order, linear partial differential
equations with constant coefficients of second order, Homogeneous & non homogeneous partial
differential equations.

Unit-5
Power Series Solution of Differential Equations, Ordinary Point, Singular point, Frobenius
Method.

References:
(1) Determination of wavelength of sodium light by Newton's Rings.
(2) Determination of Specific Rotation of Sugar solution by half shade Polari meter.
(3) Determination of refractive index of a material of a prism by spectrometer.
(4) Verification of Brewster's law.
(5) Determination of wavelength of Sodium light of by using Fresnel's Biprism.
(6) Determination of wavelength of mercury light by using Plane diffraction grating.
(7) To determine the dispersive power of a plane transmission diffraction grating.
(8) To determine the resolving power of a telescope.
(9) Determination of refractive index of water using laser.
(10) To determine the focal length of combination of two lenses separated by a distance d with the help of a nodal slide and to verify the formula: \[ \frac{1}{F} = \frac{1}{F_1} + \frac{1}{F_2} - \frac{d}{F_1F_2} \].
Integral University, Lucknow
Faculty of Science
B.Sc. (Physics, Mathematics, Computer Science), 1st Year/II nd Semester
Subject Name: Programming in C Lab
w.e.f. July-2016
Subject Code: CS117

L T P C
0 0 4 2

1. Programs based on basic concepts of C. (e.g. Addition, Subtraction, Multiplications, swapping of numbers, Conversions, area calculation, interest Calculation…etc)

2. Programs based on Conditional statement.

3. Programs based on loop Conditions (FOR, WHILE, DO-WHILE).

4. Programs based on Single & Two dimensional Array (Insertion, deletion, Multiplication, searching, etc...).

5. Programs based on Pointers.

6. Programs based on Function call (Call by value and call by reference).

7. Programs based on recursion.

8. Programs based on Strings and its operations.

9. Programs based on Structures and its operations.

10. Programs based on Miscellaneous Concepts.