

**COURSE CODE : PH1C03**  
**COURSE TITLE : APPLIED PHYSICS II**  
**UNIVERSITY : DIBRUGARH UNIVERSITY**  
**SEMESTER : SECOND SEMESTER**  
**L:T:P : 3:1:0**  
**CREDIT : 04**

**End sem. Examination for this course will carry 100 marks**

Module	Details of module	No. of Lectures
1	<b><i>Solid State Physics</i></b> covering Free electron theory (qualitative), Fermi energy, Fermi- Dirac distribution function(with derivation), Kronig-Penny model(qualitative)–formation of allowed and forbidden energy bands, Concept of effective mass–electrons and holes, Density of states (qualitative), Electron scattering and resistance, magneto-resistance, Hall effect (with derivation);Semiconductors and insulators–direct & indirect band gaps, Fermi level for intrinsic (derivation) and extrinsic semiconductors(dependence on temperature and doping concentration). Diffusion and drift current (qualitative), Conductivity and photoconductivity, Optical response; Classification of different types of diode on the basis of doping concentration (rectifier diode, Zener diode, tunnel diode); Concept of optoelectronics, Light Emitting Diode (as direct band gap material), solar cell, avalanche and photodiode;	12
2	<b><i>Laser</i></b> covering Fundamentals of LASER-Energy levels in atoms, radiation-matter interaction, absorption of light, spontaneous emission of light, Stimulated emission of light– population of energy levels, Einstein A and B coefficients, Metastable state, population inversion, resonant cavity, excitation mechanisms, Lasing action; Properties of laser, characteristics of different types of laser; Types of laser-Solid State Laser: Nd–YAG, Gas Laser – He-Ne, Semiconductor Laser; Applications of Laser in Engineering – drilling, welding, micro machining, measurement of long distances, in CD write devices & printers, in Medicine as a surgical tool, in Nuclear fusion, Holography, Optical signal processing and Remote sensing of the atmosphere; Laser safety	12
3	<b><i>Introductory Quantum Mechanics</i></b> covering Concept of de Broglie’s Matter waves, derivation of wavelength of matter waves in different forms, Heisenberg’s Uncertainty principle, illustration-why an electron cannot exist in the nucleus; Concept of Phase velocity and Group velocity(qualitative);Concept of wave function $\Psi$ and interpretation of $ \Psi ^2$ ; Schrödinger’s Time independent equation, Applications of Schrödinger’s equation (qualitative treatment)–a)Particle in one dimensional rigid box, b) Potential Barrier (emphasis on tunneling effect) tunnel diode, scanning-tunneling microscope c)Hydrogen atom model(qualitative); Selection rules Elements of linear vector spaces-The idea of $n$ –dimensional vector space, use of ‘bra-ket’ notation, linear independence, basis, inner product, norm of a vector; Hilbert space, Ortho normality; Matrix representation of kets and linear operators; Pauli matrices; Definitions of Hermitian, Inverse and Unitary operators; Commutators; Tensor products.	12
4	<b><i>Thermal Physics</i></b> covering Concept of Heat: Lattice vibrations–	12

	Einstein(individual) and Debye (collective), Boltzmann's distribution; Definition of temperature in terms of Boltzmann's distribution; Concept of entropy, specific heat; Attaining low temperature by variation of parameter X (like pressure, magnetic field etc.) in two steps-isothermal increase of X followed by adiabatic decrease of X. Example: a) Liquefaction of gas with X= Pressure; b) Adiabatic demagnetization; Transfer of heat by conduction, convection and radiation-Conduction in a) solids b) liquids c)gases; Convection- heat and mass transfer; Radiation- Stefan's law (statement and equation); Thermal diffusivity; Applications like, Insulation-Glass Dewar/Thermos flask ,Super insulation Dewar, High temperature furnaces; Heat pipes; Heat sinks and Forced cooling/Radiators; Heat exchangers; Solar water heater.	
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***Text/Reference***

***Books:***

1. Kittel C.,Introductionto SolidStatePhysics,WileyEastern
2. Solid State Physics by AJ Dekker
3. Elementary Solid State Physics by Omar, Pearson Publication
4. LaudB.B.,LasersandNon-LinearOptics,NewAgePublications
5. Essentials of Laser Physics by GD Baruah, Pragati Prakashan
6. Quantum Mechanics by Leonard I Schiff
7. Quantum Mechanics by G Aruldas
8. A treatise on Heat by Saha & Srivastava
9. GuyK.White,ExperimentalTechniquesinLowTemperaturePhysics,OxfordSciencePublications
10. Books with titles-Engineering Physics

**COURSE CODE : PH1C04**  
**COURSE TITLE : APPLIED PHYSICS LABORATORY II**  
**UNIVERSITY : DIBRUGARH UNIVERSITY**  
**SEMESTER : SECOND SEMESTER**  
**L:T:P : 0:0:2**  
**CREDIT : 01**

**End sem. Examination for this course will carry 50 marks**

Experiments	List of experiments
1	Study of series and parallel resonance circuits with identification of the resonant frequency.
2	Determination of the Young's modulus of the material of a beam by bending.
3	Determination of the co-efficient of viscosity of a liquid by its flow through a capillary tube.
4	Determination of specific heat of a liquid by the method of Newton's law of cooling.
5	Drawing of I-D curve for a ray of light passing through a prism with the

	help of a spectrometer and determination of the refractive index of the material of the prism.
6	Determination of the acceleration due to gravity by Kater's pendulum.
7	Determination of frequency of a source of sound (a tuning fork) by means of a sonometer.
8	Study of the variation of thermo e.m.f with temperature for a given thermocouple and determination of (a) the neutral temperature (b) melting point of a substance.
9	Study of the variation of magnetic field with distance along the axis of a circular current carrying coil.
10	Determination of the band gap of a material.
11	Study of the characteristics of a PN junction diode.
12	Study of transistor characteristics.
13	Determination of Planck's constant using photocell.
14	Hall Effect and determination of Hall coefficient.
15	Determination of dielectric constant
16	Moment of inertia studies.

**COURSE CODE** : CS1C02  
**COURSE TITLE** : COMPUTER PROGRAMMING LABORATORY  
**UNIVERSITY** : DIBRUGARH UNIVERSITY  
**SEMESTER** : SECOND SEMESTER  
**CREDIT** : 01  
**L:T:P** : 0:0:2

**End sem. Examination for this course will carry 50 marks**

Experiments	List of experiments
1	Algorithm, flowchart, Pseudo code
2	Simple C Programming examples showing structure of a C program, data types and operators.
3	C programs on control structures and formatted I/O
4	C programs on functions
5	C programs on preprocessor directives, C programs on scope
6	C program examples showing Array applications
7	C programs on pointers, pointers and arrays
8	C programs on strings, strings and pointers.
9	C programs on structures, unions, arrays of structures, pointers and structures
10	Writing programs for implementation of Insertion, deletion and traversal operations on stack, queues and trees
11	Self referential structures, implementation of Insertion, Deletion and Searching operations on linked linear list
12	C programs on searching and sorting

**COURSE CODE** : CS1C01  
**COURSE TITLE** : COMPUTER PROGRAMMING  
**UNIVERSITY** : DIBRUGARH UNIVERSITY  
**SEMESTER** : SECOND SEMESTER  
**CREDIT** : 03  
**L:T:P** : 3:0:0

**End sem. Examination for this course will carry 100 marks**

Module	Details of module	No. of Lectures
1	Introduction to computer organization; Software and hardware, Definition and examples of Operating System, Machine language, Assembly Language, High Level Language, Procedural & Object Oriented Programming Methodologies, Structured Programming	4
2	Introduction to C language with the help of a simple 'hello world' program, Data types in C, operators in C language, Control Structures – If else, While, for, do-while, Switch, break and continue statements, Formatted input-output for printing Integers, floating point numbers, characters and strings.	6
3	<i>Designing Structured Programs in C</i> - Top Down Design and Stepwise refinement, C function as a module, Function Definition, Prototypes, Header files, Parameter passing in C, Call by Value and Call by Reference; Standard Library functions, Recursive functions, Preprocessor commands, Scope, Storage classes.	6
4	Introduction to arrays, declaring arrays in C, Passing arrays to functions, two – dimensional arrays, Multidimensional arrays.	2
5	Introduction to Pointers in C, Pointer variable declaration and Initialization. Pointer operators, Pointer expressions and arithmetic, Relationship between pointers and arrays; Concept of strings in C, Standard String Functions.	5
6	Introduction to Derived types, Declaration, definition and initialization of structures, accessing structures, passing structures to functions, unions, arrays of structures, structures and pointers, self referential structures.	4
7	Introduction to Data Structures, Stacks, Queues, Trees, representation using arrays.	2

***Text/Reference Books:***

1. Y.P. Kanetkar - Let us C, Infinity Science Press
2. Y.P. Kanetkar - Understanding pointers in, BPB Publication
3. Dietel & Dietel (2000), *C – How to Program*, Pearson Education
4. Ellis Horowitz, Sartaj Sahni, Susan Anderson (1993), *Fundamentals of Data Structures in C*, Prentice Hall of India.
5. B.W. Kernighan and Dennis M.Ritchie- *The C Programming Language*, Pearson Education, 1988.
6. J.R. Hanly and E.B. Koffman - *Problem Solving and Program Design in C*, Pearson Education, 2007.

**COURSE CODE** : HS1C03  
**COURSE TITLE** : ECONOMICS FOR ENGINEERS  
**UNIVERSITY** : DIBRUGARH UNIVERSITY  
**SEMESTER** : SECOND SEMESTER  
**CREDIT** : 02  
**L:T:P** : 2:0:0

**End sem. Examination for this course will carry 50 marks**

Module	Details of module	No. of Lectures
1	<p><b>Module 1:</b> Basic Principle and Methodologies of Economics (Basic concepts), Demand/supply – elasticity, Government policies and application, Theory of the firm and market structure, Basic macroeconomic concepts (including GDP/GNP/NI/disposable income), Aggregate demand and supply (IS/LM), Price indices (WIP/CPI), Interest rates, Direct and indirect taxes</p> <p><b>Module 2:</b> Public sector economics –Welfare, Externalities, Labour market, Components of monetary and financial system, Central bank, Commercial banks and their functions, Capital and debt market, Monetary and fiscal policy – Tools and their impact on the economy, Inflation and Phillips curve</p> <p><b>Module 3:</b> Elements of business/managerial economics and forms of organizations, Cost and cost control – techniques, types of costs, budgets, break even analysis, capital budgeting, application of linear programming, investment analysis – NPV, ROI, IRR, payback period (5 lectures)</p>	5  5  5

**Text and Reference Books:**

1. Dewett, K.K. and Varma, J.D. *Elementary Economic Theory*, s. Chand and Company Ltd.
2. Maddala, G.S. and Ellen Miller, *Micro Economics Theory and Applications*, Tata McGraw Hill.
3. Allen, R.G.D., *Mathematical Analysis for Economics*, Macmillan.
4. Chiang, A.C., *Fundamental Methods of Mathematical Economics*, McGraw Hill.
5. Gupta, S.P., *Statistical Methods*, S.Chand and Sons Publishers.
6. Paul, R.R., *Monetary Economics*, Kalyani Publishers.
7. Dutt, Ruddar and Sundharam, K.P.M., *Indian Economy*, S.Chand and Company Ltd.
8. Choudhury, R.K., *Public Finance and Fiscal Policy*, Kalyani Publishers.
9. Jhingan, M.L., *Micro Economics Theory*, Vrinda Publisher (P) Ltd.
10. Afazuddin Ahmed and Gulzar Begum, *Engineering Economics*, Chandra Prakash.
11. Dewett, K.K., *Modern Economic Theory*

**COURSE CODE : CH1C04**  
**COURSE TITLE : ENGINEERING CHEMISTRY LABORATORY II**  
**UNIVERSITY : DIBRUGARH UNIVERSITY**  
**SEMESTER : SECOND SEMESTER**  
**L:T:P : 0:0:2**  
**CREDIT : 01**

**End sem. Examination for this course will carry 50 marks**

Experiments	List of experiments	Contact hrs
1	Determination of surface tension of a given liquid at room temperature by stalagmometer.	12
2	Determination of co-efficient of viscosity of a given liquid by Ostwald's viscometer.	
3	Determination of $\lambda_{max}$ of simple organic compound with the help of spectrophotometer.	
4	Determination of strength of strong and weak acid & bases by $p^h$ metric method.	
5	Separation of components of a mixture by paper – chromatography.	
6	Measurement of conductivity of an electrolyte.	

**COURSE CODE : CH1C03**  
**COURSE TITLE : ENGINEERING CHEMISTRY II**  
**UNIVERSITY : DIBRUGARH UNIVERSITY**  
**SEMESTER : SECOND SEMESTER**  
**CREDIT : 04**  
**L:T:P : 3:1:0**

**End sem. Examination for this course will carry 100 marks**

Module	Details of module	No. of Lectures
1	Electrochemistry covering Conductance, cell constant and its determination. Single electrode potentials, electrolytic and galvanic cells. Emf series, Nernst equation, cell emf measurement, reversible and irreversible cells	06
2	Corrosion covering Definition and scope of corrosion, direct chemical corrosion, and electrochemical corrosion and its mechanisms. Types of electrochemical corrosion (differential aeration, galvanic, concentration cell). Typical electrochemical corrosion like pitting, inter – granular, soil, waterline. Factors affecting corrosion, protection of corrosion. Applications with few practical problems of corrosion.	08
3	Energy sciences covering fuels (conventional) – types of fuels. Calorific value, determination of calorific value. Refining of petroleum, liquid fuels, fuels for IC engines, knocking and antiknock agents, octane and cetane values, cracking of oils, alternative sources of energy, limitations of fossil fuels. Non-conventional sources of energy – advantages and disadvantages. Nuclear energy production from nuclear reactions, brief idea of nuclear reactor. Battery technology -- fundamental of primary cells, rechargeable batteries, Ni – Cd, Ni – metal hydride. Fuel cells -- principles, applications, advantages and disadvantages.	10
4	Nanomaterials covering introduction, fullerenes, carbon nano tubes,	06

	nanowires : electronic and mechanical properties . Application of nanomaterials -- catalysis , electronics and telecommunications , medicines , composites , energy sciences . Fundamentals of nanomaterials.	
5	Environmental chemistry covering air pollution, noise pollution, optimum decibel levels, water pollution. Determination and significance of cod, bod ,toc . Numerical problems. Solid waste treatment and collection of nkp. Green house effect and global warming. E – Waste and radioactive pollution. Role of electromagnetic radiation in global warming.	10
6	Metals and alloys covering Gibb’s phase rule , phase rule application to water , two component system s – pb – ag / fe – c phase equilibrium diagram. Types of alloys – ferrous and non- ferrous alloys. Carbon steel, alloy steel. Alloys of cu, al ,pb .	05

**COURSE CODE : ME1C03**  
**COURSE TITLE : ENGINEERING MECHANICS LABORATORY**  
**UNIVERSITY : DIBRUGARH UNIVERSITY**  
**SEMESTER : SECOND SEMISTER**  
**CREDIT : 01**  
**L:T:P : 0:0:2**

**End sem. Examination for this course will carry 50 marks**

Experiments	List of experiments
1	Determination of coefficient of friction
2	Parallelogram law of forces
3	Screw jack
4	Rope and pulley system
5	Parallel force systems
6	Law of conservation of mass

**COURSE CODE : ME1C02**  
**COURSE TITLE : ENGINEERING MECHANICS**  
**UNIVERSITY : DIBRUGARH UNIVERSITY**  
**SEMESTER : SECOND SEMESTER**  
**CREDIT : 04**  
**L:T:P : 3:1:0**

**End sem. Examination for this course will carry 100 marks**

Module	Details of module	No. of Lectures
1	<i>Introduction to Engineering Mechanics</i> covering, Basic concepts, System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Virtual work	
2	<i>Friction</i> covering, Types of friction, Limiting friction, Laws of Friction,	

	Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack; ladder friction, lifting machine	
3	<i>Centroid and Centre of Gravity</i> covering, Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Mass moment inertia of circular plate, Cylinder, Cone, Sphere, Hook.	
4	Analysis of framed structure (Trusses), perfect and important frame, determinations of reactions, determination of stress- tensile and compression, graphical method, analytical method.	
5	<i>Introduction to Dynamics</i> covering, Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation;	
6	<i>Mechanical Vibrations</i> covering, Basic terminology, free and forced vibrations, resonance and its effects; Degree of freedom; Derivation for frequency and amplitude of free vibrations without damping and single degree of freedom system, simple problems, types of pendulum, use of simple, compound and torsion pendulums;	

**Text/Reference Books:**

1. Shanes and Rao (2006), *Engineering Mechanics*, Pearson Education,
2. Hibler and Gupta (2010), *Engineering Mechanics (Statics, Dynamics)* by Pearson Education
3. Reddy Vijaykumar K. and K. Suresh Kumar(2010), *Singer's Engineering Mechanics*
4. Bansal R.K.(2010), *A Text Book of Engineering Mechanics*, Laxmi Publications
5. Khurmi R.S. (2010), *Engineering Mechanics*, S. Chand & Co.
6. Tayal A.K. (2010), *Engineering Mechanics*, Umesh Publications

**COURSE CODE : MC1C01**  
**COURSE TITLE : ENVIRONMENTAL STUDIES**  
**UNIVERSITY : DIBRUGARH UNIVERSITY**  
**SEMESTER : SECOND SEMESTER**  
**CREDIT : 00**  
**L:T:P : 0:0:0**

Module	Details of module	No. of Lectures
1	The Multidisciplinary nature of environmental studies Definition, scope and importance, Need for public awareness.	4
2	Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) Forest Resources: Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forests and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over	10



	water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, and salinity. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. f) Land resources: Land as a resources, land degradation, man-induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
3	Ecosystems- Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers 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. Forest ecosystem, b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	10
4	Biodiversity and its conservation- Introduction – Definition: genetic, species and ecosystem diversity. Biogeographically classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, Hot-spots of biodiversity – India. Threats to biodiversity: habits loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species. Conservation of biodiversity: in-situ Ex-situ conservation of biodiversity.	10
5	Environmental Pollution- Definition, Causes, effects and control measures of : Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes – biodegradable and non biodegradable wastes. Role of an individual in prevention of pollution. Disaster Management: Floods, earthquake, cyclone and landslides.	10
6	Social Issues and the Environment- From Unsustainable to Sustainable development. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people, its problems and concerns. Environmental ethics. Climate change, global warming, acid rain, ozone layer depletion, unclear accidents and holocaust. Wasteland reclamation. Consumerism and waste products. Environmental Legislation. Public awareness.	10
7	Human Population and the Environment- Population growth, variation among nations. Population explosion – Family Welfare Programme. Environment and human health and hygiene (including Sanitation and HIV/AIDS) etc. Role of Information Technology in Environment and Human Health.	10

## REFERENCES

1. Agarwal, K.C. 2001 Environmental Biology, Nidi publ. Ltd. Bikaner.
2. Bharucha Earch, The Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmadabad – 380 013, India Email: Mapin@icenet.net (R)

3. Bharucha Erach, Text book on Environmental Studies, UGC, New Delhi
  4. Borua P.K., J.N.Sarma and others, A Text book on Environmental Studies, Banlata, Dibrugarh
  5. Brunner R.C., 1989 Hazardous Waste Incineration, McGraw Hill Inc. 480p.
  6. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB).
  7. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jacio Publ. House, Mumbai, 1196p.
  8. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
  9. Down to Earth, Centre for Science and Environment (R).
  10. Dutta Prasanna, Rofique Ahmed & Sumbit Chaliha, Environmental Studies., Eunika Publication, Jorhat
  11. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security, Stockholm Env. Institute. Oxford Univ. Press 473p.
  12. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R).
  13. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
  14. Jadav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p.
  15. Joshi P.C. and Namita Joshi, A Text book of Ecology and Environment, Himalaya Publishing
  16. Kaushik Anubha and C.P.Kaushik ,Perspective in Environmental Studies, New Age International
  17. Mckinney, M.L. & Schooh, R.M. 1996. Environmental Science systems & Solution, Web enhance/edition. 639p.
  18. Mhaskar A.K. Matter Hazardous, Techono-Science Publications (TB).
  19. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB).
  20. Odum, E.P. 1911 Fundamentals of Ecology. W.B. Saunders Co. USA, 574p.
  21. Rao M.N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
  22. Sharma B.K., 2001. Environmental Chemistry. Goel Publ. House, Meerut.
  23. Survey of the Environment, the Hindu (M).
  24. Townsend C., Harper J and Michael Begon, Essentials of Ecology, Blackwell Science (TB).
  25. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R).
  26. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).
  27. Wagner K.D., 1998. Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p.
- (M) Magazine (R) Reference (TB) Textbook

**COURSE CODE : MA1C02**  
**COURSE TITLE : MATHEMATICS II**  
**(MULTIVARIATE ANALYSIS, FOURIER SERIES AND TRANSFORMS)**  
**UNIVERSITY : DIBRUGARH UNIVERSITY**  
**SEMESTER : SECOND SEMESTER**  
**CREDIT : 04**

**L:T:P : 3:1:0**

**End sem. Examination for this course will carry 100 marks**

Module	Details of module	No. of Lectures
1	Multivariate Analysis - Euler's theorem on homogeneous function .Differentiation of implicit and composite function, Errors and approximation, Jacobian, Taylor's series for function of two variables .Maxima and minima of function of two variables. Lagrange method of undetermined multipliers. Double, triple integral, change of variable, change of order of integration, Greens theorem connecting line and surface integral. Application to areas ,volumes Improper integrals, Beta and Gamma functions. Differentiation under integral sign.	24
2	Fourier series and Transforms - Sine, cosine series in any interval, Half range series. Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier sine and cosine transforms, properties of Fourier transforms: linear property, change of scale property and shifting property.	12
3	Laplace Transforms - Laplace transforms of elementary functions. Properties of Laplace transform. Laplace transforms of derivatives and integrals. Laplace transforms of periodic function, unit step function, error function and Bessel's function. Inverse Laplace transform and it's properties, Inverse Laplace transform of derivatives and integrals, convolution theorem. Application to ordinary differential equations.	12

**Text Books/References:**

1. Advanced Engineering Mathematics by Erwin Kreysig (Willy)
2. Higher Engineering Mathematics by B.S. Grewal
3. A Text book of Engineering Mathematics by N.P. Bali and Dr.Manish Goyal
4. Theory and problems of Laplace transforms By Murray R.Spiegel.
5. Differential Calculus By B.C.Das & B.N. Mukherjee
6. Mathematical Analysis By S.C.Malik & Savita Arora

**COURSE CODE : HS1C04**  
**COURSE TITLE : PRESENTATION SKILLS**  
**UNIVERSITY : DIBRUGARH UNIVERSITY**  
**SEMESTER : SECOND SEMESTER**  
**CREDIT : 02**  
**L:T:P : 1:2:0**

**End sem. Examination for this course will carry 50 marks**

Module	Details of module	No. of Lectures
1	<i>Communication and personality development</i> covering Psychological aspects of communication, audience analysis, types of audience, importance of audience analysis, analyzing individual and members of groups, adapting message to audience.	4
2	<i>Carrier Oriental Communication</i> covering Resume and bio-data: Design and style; Applying for a job: Language and format of job application. Job	4

	Interviews: purpose and process; Group discussion: structure and process; Techniques of effective participation in group discussion; Model group discussion through the choice of appropriate programmes.	
3	<b>Professional speaking and Advanced Techniques in Technical Communication</b> covering Elements of effective presentation; Connecting with audience during presentation; Planning and preparation a model presentation. Power-point presentation; Seminar Preparation; Professional interaction.	5

**Text/Reference books:**

1. Fred Luthans, *Organizational Behaviour*, McGraw Hill
2. Lesikar and petit, *Report writing for Business*
3. M. Ashraf Rizvi, *Effective Technical Communication*, McGraw Hill
4. Wallace and masters, *Personal Development for Life and Work*, Thomson Learning
5. Hartman Lemay, *Presentation Success*, Thomson Learning
6. Malcolm Goodale, *Professional Presentations*
7. Farhathullah, T. M. *Communication skills for Technical Students*
8. Michael Muckian, John Woods, *The Business letters Handbook*
9. Herta A. Murphy, *Effective Business Communication*
10. *MLA Handbook for Writers of Research Papers*

**COURSE CODE : HS1C01**  
**COURSE TITLE : SOCIOLOGY**  
**UNIVERSITY : DIBRUGARH UNIVERSITY**  
**SEMESTER : SECOND SEMESTER**  
**CREDIT : 02**  
**L:T:P : 2:0:0**

**End sem. Examination for this course will carry 50 marks**

Module	Details of module	No. of Lectures
1	Introduction to Sociology concepts – structures, system, organisation, social institutions, culture, civilization, social stratification (Caste, class, gender, power), state and civil society	7
2	Political economy of Indian society, industrial, urban, agrarian and tribal society, caste, class, ethnicity and gender, ecology and environment.	6
3	Social change in contemporary India – Modernisation, Westernisation, Globalisation, Secularism and Communalism, name of development, changing nature of work and organisation	7
4	Science, technology and society – meaning and differences, social process of innovations, influence of social factors on scientific innovation, technology and rate of social change.	4

**Text and Reference Books:**

1. Introduction to sociology – Dr.Sachdeva and Vidyabhushan
2. Principles of Sociology with an Introduction to Social Thought – C.N. Shankar Rao