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**MODIFIED CBCS CURRICULUM OF  
PHYSICS GENERAL PROGRAMME**

**SUBJECT CODE = 00**

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FOR UNDER GRADUATE COURSES UNDER RANCHI UNIVERSITY



Implemented from  
Academic Session 2019-2022



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COURSE STRUCTURE FOR UNDERGRADUATE '**GENERAL**' PROGRAMME**Table A -1: Distribution of 120 Credits** [\*wherever there is a practical there will be no tutorial and vice –versa.]

Course	Papers	Credits	
		Theory + Practical	Theory + Tutorial
<b>I. Core Course</b>	<b>(DSC A to D)</b>		
<b>04 Courses from each of the 03 discipline of choice</b>			
Theory	4x3=12 Papers	12X4=48	12X5=60
Practical/Tutorial*	4x3=12 Papers	12X2=24	12X1=12
<b>II. Elective Course (EC)</b>			
<b>A. Discipline Specific Elective</b>	<b>(DSE A &amp; B)</b>		
<b>02 Courses from each of the 03 discipline of choice</b>			
Theory	2X3=6 Papers	6X4=24	6X5=30
Practical/ Tutorial*	2X3=6 Papers	6X2=12	6X1=6
<b>III. Ability Enhancement Compulsory Courses (AECC)</b>			
1. English/ MIL Communication/ MIL+NH/ Business Communication for Commerce	1 Paper	1X2=2	1X2=2
2. Environmental Science	1 Paper	1x2=2	1x2=2
3. Skill Enhancement Course of the Core Course opted	<b>(SEC 1, 2, 3 &amp; 4)</b> 4 Papers	4X2=8	4X2=8
<b>Total Credit = 120</b>			<b>= 120</b>

**Table A -2: Course structure for B.Sc. (Undergraduate Programme)**

Semester	Course (Core Courses) 12 Papers	Allied (Elective Courses) 6 Papers	Ability Enhancement (Compulsory Courses) 6 Papers	Total Credits
Sem-I	DSC-1A, DSC-2A, DSC-3A (6+6+6=18 Credits)	---	Eng / Hindi Comm/ NH+MB (02 Credits)	<b>20 Credits</b>
Sem-II	DSC-1B, DSC-2B, DSC-3B (6+6+6=18 Credits)	---	EVS (02 Credits)	<b>20 Credits</b>
Sem-III	DSC-1C, DSC-2C, DSC-3C (6+6+6=18 Credits)	---	SEC-1 (02 Credits)	<b>20 Credits</b>
Sem-IV	DSC-1D, DSC-2D, DSC-3D (6+6+6=18 Credits)	---	SEC-2 (02 Credits)	<b>20 Credits</b>
Sem-V	---	DSE-1A, DSE-2A, DSE-3A (6+6+6=18 Credits)	SEC-3 (02 Credits)	<b>20 Credits</b>
Sem-VI	---	DSE-1B, DSE-2B, DSE-3B (6+6+6=18 Credits)	SEC-4 (02 Credits)	<b>20 Credits</b>

**Total = 120 Credits**

## COURSES OF STUDY FOR UNDERGRADUATE 'B. Sc. General' PROGRAMME

**Table A -3: Basic Course structure for SCIENCE (Undergraduate Programme) Total:120 Credits**

Sem	Course (Core Courses)		Allied (Elective Courses)		Ability Enhancement (Compulsory Courses)	
	Code	4 x 3 = 12 Papers	Code	2 x 3 = 6 Papers	Code	1 + 1 + 4 = 6 Papers
<b>I</b>	DSC1A DSC2A DSC3A	Core Subject 1; Paper A Core Subject 2; Paper A Core Subject 3; Paper A			Compulsory Language Communication ENG/ MIL/ MIL+NH	
<b>II</b>	DSC1B DSC2B DSC3B	Core Subject 1; Paper B Core Subject 2; Paper B Core Subject 3; Paper B			EVS	Environmental Science
<b>III</b>	DSC1C DSC2C DSC3C	Core Subject 1; Paper C Core Subject 2; Paper C Core Subject 3; Paper C			SEC1	SEC1: Elementary Computer Application Softwares + <b>Lab</b>
<b>IV</b>	DSC1D DSC2D DSC3D	Core Subject 1; Paper D Core Subject 2; Paper D Core Subject 3; Paper D			SEC2	SEC2 of Either Core Subject 1,2 or 3
<b>V</b>			DSE1A DSE2A DSE3A	Core Subject 1 Core Subject 2 Core Subject 3	SEC3	SEC3 of same subject opted in Sem III
<b>VI</b>			DSE1B DSE2B DSE3B	Core Subject 1 Core Subject 2 Core Subject 3	SEC4	SEC4 of same subject opted in Sem III

**Table A -4: Course structure for PHYSICS (Undergraduate Programme)****Total: 120 Credits**

Semester	Course (Core Courses)		Allied (Elective Courses)		Ability Enhancement (Compulsory Courses)	
	Code	4 Papers	Code	2 Papers	Code	4 Papers
<b>I</b>	DSC-A	Mechanics + <b>Lab</b>			Compulsory Language Communication	
<b>II</b>	DSC-B	Electricity and Mechanism + <b>Lab</b>			EVS	Environmental Science
<b>III</b>	DSC-C	Thermal and Statistical Physics + <b>Lab</b>			SEC1	Elementary Computer Application Softwares
<b>IV</b>	DSC-D	Waves & Optics + <b>Lab</b>			SEC2	Electrical Circuit Network Skills + <b>Lab</b>
<b>V</b>			DSE-A	Nuclear & Particle Physics + <b>T</b>	SEC3	Basic Instrumentation Skills + <b>Lab</b>
<b>VI</b>			DSE-B	Classical Dynamics + <b>T</b>	SEC4	Renewable Energy & Energy Harvesting + <b>Lab</b>

**Table A-5: Subject Combinations allowed for B. Sc. General Programme:**

	Subject 1	Subject 2	Subject 3
1	Mathematics	Physics	Chemistry/ Geology
2	Mathematics	Chemistry	Geology
3	Botany	Zoology	Chemistry/ Geology

**Table A-6: Semester wise Structure for Mid Sem & End Sem Examinations:**

Sem	Core Honours, Allied DSE, Compulsory AECC Courses		Examination Structure		
	Code	Papers	Mid Semester Theory (F.M.)	End Semester Theory (F.M.)	End Semester Practical/ Viva (F.M.)
I	DSC-A	Mechanics +Lab	---	75	25
	AECC	Language Communication	---	100	---
II	DSC-B	Electricity and Mechanism +Lab	---	75	25
	AECC	EVS	---	100	---
III	DSC-C	Thermal and Statistical Physics +Lab	---	75	25
IV	DSC-D	Waves & Optics +Lab	---	75	25
V	DSE-A	Nuclear & Particle Physics +T	---	100	---
VI	DSE-B	Classical Dynamics +T	---	100	---

**Table A-7: Semester wise Structure for End Sem Examination of Skill Enhancement Course:**

Sem	Skill Enhancement Course SEC		Examination Structure		
	Code	Papers	Mid Semester Theory (F.M.)	End Semester Theory (F.M.)	End Semester Practical/ Viva (F.M.)
III	SEC 1	Elementary Computer Application Software +Lab	---	100	---
IV	SEC 2	Electrical Circuit Network Skills +Lab	---	100	---
V	SEC 3	Basic Instrumentation Skills +Lab	---	100	---
VI	SEC 4	Renewable Energy & Energy Harvesting +Lab	---	100	---

**SEMESTER I****4 Papers****Total 100 x 4 = 400 Marks****I. ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)**

(Credits: Theory-02)

Any One Compulsory Language Communication Prescribed by Ranchi University:

English Communication/ Hindi Communication / NH + MB Communication

**II. CORE COURSE –DSC-A:**

(Credits: Theory-04, Practicals-02)

**Marks : 75 (ESE: 3Hrs) + 25 (Pr 3Hrs)=100****Pass Marks: Th ESE = 30 + Pr ESE =10*****Instruction to Question Setter for  
End Semester Examination (ESE):***

*There will be two group of questions. Group A is compulsory and will contain two questions. Question No.1 will be very short answer type consisting of ten questions of 1 mark each. Question No.2 will be short answer type of 5 marks. Group B will contain descriptive type six questions of fifteen marks each, out of which any four are to answer.*

*Note: There may be subdivisions in each question asked in Theory Examinations.*

**MECHANICS****Theory: 60 Lectures****Vectors:**

Vector algebra. Scalar and vector products. Derivatives of a vector with respect to a parameter.

**(4 Lectures)****Ordinary Differential Equations:**1st order homogeneous differential equations. 2<sup>nd</sup> order homogeneous differential equations with constant coefficients.**(6 Lectures)****Laws of Motion:**

Frames of reference. Newton's Laws of motion. Dynamics of a system of particles. Centre of Mass.

**(10 Lectures)****Momentum and Energy:**

Conservation of momentum. Work and energy. Conservation of energy. Motion of rockets.

**(6 Lectures)****Rotational Motion:**

Angular velocity and angular momentum. Torque. Conservation of angular momentum.

**(5 Lectures)****Gravitation:**

Newton's Law of Gravitation. Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). Kepler's Laws (statement only). Satellite in circular orbit and applications. Geosynchronous orbits. Basic idea of global positioning system (GPS). Weightlessness. Physiological effects on astronauts.

**(8 Lectures)**



**Oscillations:**

Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. Damped oscillations.

(6 Lectures)

**Elasticity:**

Hooke's law - Stress-strain diagram - Elastic moduli-Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants - Work done in stretching and work done in twisting a wire – Twisting couple on a cylinder - Determination of Rigidity modulus by static torsion – Torsional pendulum-Determination of Rigidity modulus and moment of inertia -  $q$ ,  $\eta$  and  $\sigma$  by Searles method.

(8 Lectures)

**Speed Theory of Relativity:**

Constancy of speed of light. Postulates of Special Theory of Relativity. Length contraction. Time dilation. Relativistic addition of velocity.

(7 Lectures)

*Note: Students are not familiar with vector calculus. Hence all examples involve differentiation either in one dimension or with respect to the radial coordinate*

**Reference Books:**

- University Physics. F.W. Sears, M.W. Zemansky and H.D. Young, 13/e, 1986. Addison-Wesley
- Mechanics Berkeley Physics, v.1: Charles Kittel, et. al. 2007, Tata McGraw-Hill.
- Physics – Resnick, Halliday & Walker 9/e, 2010, Wiley
- University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

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**PHYSICS LAB- DSC A LAB**

60 Lectures

1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.
2. To determine the Moment of Inertia of a Flywheel.
3. To determine the Young's Modulus of a bar by method of bending.
4. To determine the Elastic Constants of a Wire by Searle's method.
5. To determine  $g$  by Bar Pendulum.
6. To determine  $g$  by Kater's Pendulum.
7. To study the Motion of a Spring and calculate (a) Spring Constant, (b)  $g$ .

**Reference Books:**

- Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
  - Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4<sup>th</sup> Edition, reprinted 1985, Heinemann Educational Publishers.
  - A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11<sup>th</sup> Edition, 2011, Kitab Mahal, New Delhi.
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**SEMESTER II**


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**4 Papers****Total 100 x 4 = 400 Marks****I. ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)**

(Credits: Theory-02)

**Marks : 100 (ESE: 3Hrs) =100****Pass Marks Th ESE = 40***Instruction to Question Setter for**End Semester Examination (ESE):**There will be **objective type test** consisting of hundred questions of 1 mark each. Examinees are required to mark their answer on **OMR Sheet** provided by the University.***AECC – ENVIRONMENT STUDIES****Theory: 30 Lectures****Unit 1 : Introduction to environmental studies**

- Multidisciplinary nature of environmental studies;
- Scope and importance; Concept of sustainability and sustainable development.

**(2 lectures)****Unit 2 : Ecosystems**

- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems :
  - a. Forest ecosystem
  - b. Grassland ecosystem
  - c. Desert ecosystem
  - d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

**(2 lectures)****Unit 3 : Natural Resources : Renewable and Non---renewable Resources**

- Land resources and landuse change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water : Use and over---exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter---state).
- Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

**(5 lectures)****Unit 4 : Biodiversity and Conservation**

- Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega---biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity : Habitat loss, poaching of wildlife, man---wildlife conflicts, biological invasions; Conservation of biodiversity : In---situ and Ex---situ conservation of biodiversity.

- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

(5 lectures)

#### Unit 5 : Environmental Pollution

- Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution
- Nuclear hazards and human health risks
- Solid waste management : Control measures of urban and industrial waste.
- Pollution case studies.

(5 lectures)

#### Unit 6 : Environmental Policies & Practices

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

(4 lectures)

#### Unit 7 : Human Communities and the Environment

- Human population growth: Impacts on environment, human health and welfare.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management : floods, earthquake, cyclones and landslides.
- Environmental movements : Chipko, Silent valley, Bishnois of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

(3 lectures)

#### Unit 8 : Field work

- Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
- Visit to a local polluted site---Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems---pond, river, Delhi Ridge, etc.

(Equal to 4 lectures)

#### Suggested Readings:

- Raziuddin, M., Mishra P.K. 2014, *A Handbook of Environmental Studies*, Akanaksha Publications, Ranchi.
- Mukherjee, B. 2011: *Fundamentals of Environmental Biology*. Silverline Publications, Allahabad.
- Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
- Gadgil, M., & Guha, R. 1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.
- Gleeson, B. and Low, N. (eds.) 1999. *Global Ethics and Environment*, London, Routledge.
- Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
- Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. *Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.

- Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. *Science*, 339: 36---37.
- McCully, P. 1996. *Rivers no more: the environmental effects of dams*(pp. 29---64). Zed Books.
- McNeill, John R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*.
- Odum, E.P., Odum, H.T. & Andrews, J. 1971. *Fundamentals of Ecology*. Philadelphia: Saunders.
- Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. *Environmental and Pollution Science*. Academic Press.
- Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
- Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. *Environment*. 8th edition. John Wiley & Sons.
- Rosencranz, A., Divan, S., & Noble, M. L. 2001. *Environmental law and policy in India. Tripathi 1992*.
- Sengupta, R. 2003. *Ecology and economics: An approach to sustainable development*. OUP.
- Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
- Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
- Thapar, V. 1998. *Land of the Tiger: A Natural History of the Indian Subcontinent*.
- Warren, C. E. 1971. *Biology and Water Pollution Control*. WB Saunders.
- Wilson, E. O. 2006. *The Creation: An appeal to save life on earth*. New York: Norton.
- World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University

## II. CORE COURSE –DSC-B:

(Credits: Theory-04, Practicals-02)

Marks : 75 (ESE: 3Hrs) + 25 (Pr 3Hrs)=100

Pass Marks: Th ESE = 30 + Pr ESE =10

### *Instruction to Question Setter for End Semester Examination (ESE):*

*There will be two group of questions. Group A is compulsory and will contain two questions. Question No.1 will be very short answer type consisting of ten questions of 1 mark each. Question No.2 will be short answer type of 5 marks. Group B will contain descriptive type six questions of fifteen marks each, out of which any four are to answer.*

*Note: There may be subdivisions in each question asked in Theory Examinations.*

## ELECTRICITY AND MAGNETISM

**Theory: 60 Lectures**

### **Vector Analysis:**

Scalar and Vector product, gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only).

**(12 Lectures)**

### **Electrostatics:**

Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere. Calculation of electric field from potential. Capacitance of an isolated spherical conductor. Parallel plate, spherical and cylindrical condenser. Energy per unit volume in electrostatic field. Dielectric medium, Polarisation, Displacement vector. Gauss's theorem in dielectrics. Parallel plate capacitor completely filled with dielectric.

**(22 Lectures)**

**Magnetism:**

Magnetostatics: Biot-Savart's law and its applications- straight conductor, circular coil, solenoid carrying current. Divergence and curl of magnetic field. Magnetic vector potential. Ampere's circuital law. Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Brief introduction of dia-, para-and ferromagnetic materials.

(10 Lectures)

**Electromagnetic Induction:**

Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils. Energy stored in magnetic field.

(6 Lectures)

**Maxwell's equations and Electromagnetic wave propagation:**

Equation of continuity of current, Displacement current, Maxwell's equations, Poynting vector, energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, polarization.

(10 Lectures)

**Reference Books:**

- Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education
  - Electricity & Magnetism, J.H. Fewkes & J.Yarwood. Vol. I, 1991, Oxford Univ. Press
  - Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
  - University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
  - D.J.Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, Benjamin Cummings.
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**PHYSICS LAB- DSC B LAB**

**60 Lectures**

1. To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses.
2. Ballistic Galvanometer:
  - (i) Measurement of charge and current sensitivity
  - (ii) Measurement of CDR
  - (iii) Determine a high resistance by Leakage Method
  - (iv) To determine Self Inductance of a Coil by Rayleigh's Method.
3. To compare capacitances using De'Sauty's bridge.
4. To study the Characteristics of a Series RC Circuit.
5. To study a series LCR circuit LCR circuit and determine its (a) Resonant frequency, (b) Quality factor
6. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q
7. To verify the Thevenin and Norton theorems
8. To verify the Superposition, and Maximum Power Transfer Theorems

**Reference Books**

- Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.
  - Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4<sup>th</sup> Edition, reprinted 1985, Heinemann Educational Publishers
  - A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Ed.2011, Kitab Mahal
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**SEMESTER III**


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**4 Papers****Total 100 x 4 = 400 Marks****I. SKILL ENHANCEMENT COURSE SEC 1:** (Credits: Theory-02)

All Four Papers (One paper to be studied in each semester) of any One Subject to be opted from either of the Core Subjects opted for General Courses of Study. Refer Content from the Syllabus of opted Skill Enhancement Course Subject.

**II. CORE COURSE –DSC-C:** (Credits: Theory-04, Practicals-02)**Marks : 75 (ESE: 3Hrs) + 25 (Pr 3Hrs)=100****Pass Marks: Th ESE = 30 + Pr ESE =10*****Instruction to Question Setter for******End Semester Examination (ESE):***

*There will be two group of questions. **Group A is compulsory** and will contain two questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 will be short answer type** of 5 marks. **Group B will contain descriptive type** six questions of fifteen marks each, out of which any four are to answer.*

*Note: There may be subdivisions in each question asked in Theory Examinations.*

**THERMAL PHYSICS AND STATISTICAL MECHANICS****Theory: 60 Lectures****Laws of Thermodynamics:**

Zeroth Law of thermodynamics and temperature. First law and internal energy, conversion of heat into work, Various Thermodynamical Processes, Applications of First Law: General Relation between  $C_p$  and  $C_v$ , Work Done during Isothermal and Adiabatic Processes, Compressibility and Expansion Coefficient, Reversible and irreversible processes, Second law and Entropy, Carnot's cycle & theorem, Entropy changes in reversible & irreversible processes, Entropy-temperature diagrams, Third law of thermodynamics, Unattainability of absolute zero.

**(22 Lectures)****Thermodynamical Potentials:**

Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations and applications - Joule-Thompson Effect, Clausius- Clapeyron Equation, Expression for  $(C_p - C_v)$ ,  $C_p/C_v$ , TdS equations.

**(10 Lectures)****Kinetic Theory of Gases:**

Derivation of Maxwell's law of distribution of velocities and its experimental verification, Mean free path (Zeroth Order), Transport Phenomena: Viscosity, Conduction and Diffusion (for vertical case), Law of equipartition of energy (no derivation) and its applications to specific heat of gases; mono-atomic and diatomic gases.

**(10 Lectures)**

**Theory of Radiation:**

Blackbody radiation, Spectral distribution, Concept of Energy Density, Derivation of Planck's law, Deduction of Wien's distribution law, Rayleigh- Jeans Law, Stefan Boltzmann Law and Wien's displacement law from Planck's law.

(6 Lectures)

**Statistical Mechanics:**

Maxwell-Boltzmann law - distribution of velocity – Quantum statistics - Phase space - Fermi-Dirac distribution law - electron gas - Bose-Einstein distribution law - photon gas - comparison of three statistics.

(12 Lectures)

**Reference Books:**

- Thermal Physics, S. Garg, R. Bansal and C. Ghosh, 1993, Tata McGraw-Hill.
  - A Treatise on Heat, Meghnad Saha, and B.N. Srivastava, 1969, Indian Press.
  - Thermodynamics, Enrico Fermi, 1956, Courier Dover Publications.
  - Thermodynamics, Kinetic theory & Statistical thermodynamics, F.W.Sears and G.L. Salinger. 1988, Narosa
  - University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
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**PHYSICS LAB- DSC C LAB****60 Lectures**

1. To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method.
2. Measurement of Planck's constant using black body radiation.
3. To determine Stefan's Constant.
4. To determine the coefficient of thermal conductivity of copper by Searle's Apparatus.
5. To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method.
6. To determine the coefficient of thermal conductivity of a bad conductor by Lee's disc method.
7. To determine the temperature co-efficient of resistance by Platinum resistance thermometer.
8. To study the variation of thermo emf across two junctions of a thermocouple with temperature.
9. To record and analyze the cooling temperature of an hot object as a function of time using a thermocouple and suitable data acquisition system
10. To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge

**Reference Books:**

- Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.
  - Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4<sup>th</sup> Edition, reprinted 1985, Heinemann Educational Publishers
  - A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
  - A Laboratory Manual of Physics for Undergraduate Classes, D.P. Khandelwal, 1985, Vani Publication.
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**SEMESTER IV**


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**4 Papers****Total 100 x 4 = 400 Marks****I. SKILL ENHANCEMENT COURSE SEC 2:** (Credits: Theory-02)

All Four Papers (One paper to be studied in each semester) of any One Subject to be opted from either of the Core Subjects opted for General Courses of Study. Refer Content from the Syllabus of opted Skill Enhancement Course Subject.

**II. CORE COURSE –DSC-D:** (Credits: Theory-04, Practicals-02)**Marks : 75 (ESE: 3Hrs) + 25 (Pr 3Hrs)=100****Pass Marks: Th ESE = 30 + Pr ESE =10*****Instruction to Question Setter for******End Semester Examination (ESE):***

*There will be two group of questions. Group A is compulsory and will contain two questions. Question No.1 will be very short answer type consisting of ten questions of 1 mark each. Question No.2 will be short answer type of 5 marks. Group B will contain descriptive type six questions of fifteen marks each, out of which any four are to answer.*

*Note: There may be subdivisions in each question asked in Theory Examinations.*

**WAVES AND OPTICS****Theory: 60 Lectures****Wave Motion:**

Plane and Spherical Waves. Longitudinal and Transverse Waves. Plane Progressive (Travelling) Waves. Wave Equation. Particle and Wave Velocities. Differential Equation. Pressure of a Longitudinal Wave. Energy Transport. Intensity of Wave. Water Waves: Ripple and Gravity Waves.

**(6 Lectures)****Velocity of Waves:**

Velocity of Transverse Vibrations of Stretched Strings. Velocity of Longitudinal Waves in a Fluid in a Pipe. Newton's Formula for Velocity of Sound. Laplace's Correction.

**(6 Lectures)****Wave Optics:**

Electromagnetic nature of light. Definition and properties of wave front. Huygens Principle. Temporal and Spatial Coherence.

**(5 Lectures)****Interference:**

Division of amplitude and wavefront. Young's double slit experiment. Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection: Stokes' treatment. Interference in Thin Films: parallel and wedge-shaped films. Fringes of equal inclination (Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton's Rings: Measurement of wavelength and refractive index.

**(12 Lectures)**



**Interferometer:**

Michelson Interferometer-(1) Idea of form of fringes (No theory required), (2) Determination of Wavelength, (3) Wavelength Difference, (4) Refractive Index, and (5) Visibility of Fringes. Fabry-Perot interferometer –theory and applications.

**(6 Lectures)****Diffraction:**

Kirchhoff's Integral Theorem, Fresnel-Kirchhoff's Integral formula and its application to rectangular slit.

**(6 Lectures)****Fraunhofer diffraction:**

Single slit. Circular aperture, Resolving Power of a telescope. Single slit. Double slit. Multiple slits. Diffraction grating. Resolving power of grating.

**(10 Lectures)****Fresnel Diffraction:**

Fresnel's Assumptions. Fresnel's Half-Period Zones for Plane Wave. Explanation of Rectilinear Propagation of Light. Theory of a Zone Plate: Multiple Foci of a Zone Plate. Fresnel's Integral, Fresnel diffraction pattern of a straight edge, a slit and a wire.

**(9 Lectures)****Reference Books**

- Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill.
- Fundamentals of Optics, F.A. Jenkins and H.E. White, 1981, McGraw-Hill
- Principles of Optics, Max Born and Emil Wolf, 7th Edn., 1999, Pergamon Press.
- Optics, Ajoy Ghatak, 2008, Tata McGraw Hill
- The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley and Sons.
- The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill.

**PHYSICS LAB- DSC D LAB****60 Lectures**

1. Familiarization with: Schuster's focusing; determination of angle of prism.
2. To determine refractive index of the Material of a prism using sodium source.
3. To determine the dispersive power and Cauchy constants of the material of a prism using mercury source.
4. To determine wavelength of sodium light using Fresnel Biprism.
5. To determine wavelength of sodium light using Newton's Rings.
6. To determine the thickness of a thin paper by measuring the width of the interference fringes produced by a wedge-shaped Film.
7. To determine wavelength of (1) Na source and (2) spectral lines of Hg source using plane diffraction grating.
8. To determine dispersive power and resolving power of a plane diffraction grating.

**Reference Books**

- Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
- A Text Book of Practical Physics, I. Prakash & Ramakrishna, 11th Ed., 2011, Kitab Mahal
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
- A Laboratory Manual of Physics for undergraduate classes, D.P.Khandelwal, 1985, Vani Pub.

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**SEMESTER V**


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**4 Papers****Total 100 x 4 = 400 Marks****I. SKILL ENHANCEMENT COURSE SEC 3:** (Credits: Theory-02)

All Four Papers (One paper to be studied in each semester) of any One Subject to be opted from either of the Core Subjects opted for General Courses of Study. Refer Content from the Syllabus of opted Skill Enhancement Course Subject

**II. PHYSICS SPECIFIC –DSE A:** (Credits: Theory-05, Tutorials-01)**Marks : 100 (ESE 3Hrs) =100****Pass Marks Th ESE = 40*****Instruction to Question Setter for******End Semester Examination (ESE):***

*There will be two group of questions. Group A is compulsory and will contain three questions. Question No.1 will be very short answer type consisting of ten questions of 1 mark each. Question No.2 & 3 will be short answer type of 5 marks. Group B will contain descriptive type six questions of 20 marks each, out of which any four are to answer.*

*Note: There may be subdivisions in each question asked in Theory Examinations.*

**NUCLEAR AND PARTICLE PHYSICS****Theory: 75 Lectures Tutorial: 15 Lectures****General Properties of Nuclei:**

Constituents of nucleus and their Intrinsic properties, quantitative facts about mass, radii, charge density (matter density), binding energy, average binding energy and its variation with mass number, main features of binding energy versus mass number curve, N/A plot, angular momentum, parity, magnetic moment, electric moments, nuclear excited states.

**(10 Lectures)****Nuclear Models:**

Liquid drop model approach, semi empirical mass formula and significance of its various terms, condition of nuclear stability, Fermi gas model (degenerate fermion gas, nuclear symmetry potential in Fermi gas), evidence for nuclear shell structure, nuclear magic numbers, basic assumption of shell model, concept of mean field, residual interaction, concept of nuclear force.

**(12 Lectures)****Radioactivity decay:**

- (a) Alpha decay: basics of  $\alpha$ -decay processes, theory of  $\alpha$ - emission, Gamow factor, Geiger Nuttall law,  $\alpha$ -decay spectroscopy.
- (b)  $\beta$ -decay: energy kinematics for  $\beta$ -decay, positron emission, electron capture, neutrino hypothesis.
- (c) Gamma decay: Gamma rays emission & kinematics, internal conversion.

**(12 Lectures)**

**Nuclear Reactions:**

Types of Reactions, Conservation Laws, kinematics of reactions, Q-value, reaction rate, reaction cross section, Concept of compound and direct Reaction, resonance reaction, Coulomb scattering (Rutherford scattering).

(10 Lectures)

**Interaction of Nuclear Radiation with matter:**

Energy loss due to ionization (Bethe- Block formula), energy loss of electrons, Cerenkov radiation. Gamma ray interaction through matter, photoelectric effect, Compton scattering, pair production, neutron interaction with matter.

(7 Lectures)

**Detector for Nuclear Radiations:**

Gas detectors: estimation of electric field, mobility of particle, for ionization chamber and GM Counter. Basic principle of Scintillation Detectors and construction of photo-multiplier tube (PMT). Semiconductor Detectors (Si and Ge) for charge particle and photon detection (concept of charge carrier and mobility), neutron detector.

(10 Lectures)

**Particle physics:**

Particle interactions; basic features, types of particles and its families. Symmetries and Conservation Laws: energy and momentum, angular momentum, parity, baryon number, Lepton number, concept of quark model.

(14 Lectures)

**Reference Books:**

- Introductory nuclear Physics by Kenneth S. Krane (Wiley India Pvt. Ltd., 2008).
  - Concepts of nuclear physics by Bernard L. Cohen. (Tata McGraw Hill, 1998).
  - Introduction to the physics of nuclei & particles, R.A. Dunlap. (Thomson Asia, 2004).
  - Introduction to High Energy Physics, D.H. Perkins, Cambridge Univ. Press
  - Introduction to Elementary Particles, D. Griffith, John Wiley & Sons
  - Quarks and Leptons, F. Halzen and A.D. Martin, Wiley India, New Delhi
  - Basic ideas and concepts in Nuclear Physics - An Introductory Approach by
  - K. Heyde (IOP- Institute of Physics Publishing, 2004).
  - Radiation detection and measurement, G.F. Knoll (John Wiley & Sons, 2000).
  - Physics and Engineering of Radiation Detection, Syed Naeem Ahmed (Academic Press, Elsevier, 2007).
  - Theoretical Nuclear Physics, J.M. Blatt & V.F. Weisskopf (Dover Pub.Inc., 1991)
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**SEMESTER VI**


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**4 Papers****Total 100 x 4 = 400 Marks****I. SKILL ENHANCEMENT COURSE SEC 4:** (Credits: Theory-02)

All Four Papers (One paper to be studied in each semester) of any One Subject to be opted from either of the Core Subjects opted for General Courses of Study. Refer Content from the Syllabus of opted Skill Enhancement Course Subject

**II. PHYSICS SPECIFIC –DSE B:** (Credits: Theory-04, Practicals-02)**Marks : 100 (ESE 3Hrs) =100****Pass Marks Th ESE = 40***Instruction to Question Setter for**End Semester Examination (ESE):*

There will be **two** group of questions. **Group A is compulsory** and will contain three questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 & 3 will be short answer type** of 5 marks. **Group B will contain descriptive type** six questions of 20 marks each, out of which any four are to answer.

*Note: There may be subdivisions in each question asked in Theory Examinations.*

**CLASSICAL DYNAMICS****Theory: 75 Lectures**

*The emphasis of the course is on applications in solving problems of interest to physicists. Students are to be examined on the basis of problems, seen and unseen.*

**Classical Mechanics of Point Particles:**

Generalised coordinates and velocities. Hamilton's Principle, Lagrangian and Euler-Lagrange equations. Applications to simple systems such as coupled oscillators. Canonical momenta & Hamiltonian. Hamilton's equations of motion. Applications: Hamiltonian for a harmonic oscillator, particle in a central force field. Poisson brackets. Canonical transformations.

**(22 Lectures)****Special Theory of Relativity:**

Postulates of Special Theory of Relativity. Lorentz Transformations. Minkowski space. The invariant interval, light cone and world lines. Space-time diagrams. Time-dilation, length contraction & twin paradox. Four-vectors: space-like, time-like & light-like. Four-velocity and acceleration. Metric and alternating tensors. Four-momentum and energy-momentum relation. Doppler effect from a fourvector perspective. Concept of four-force. Conservation of four-momentum. Relativistic kinematics. Application to two-body decay of an unstable particle. The Electromagnetic field tensor and its transformation under Lorentz transformations: relation to known transformation properties of **E** and **B**. Electric and magnetic fields due to a uniformly moving charge. Equation of motion of charged particle & Maxwell's equations in tensor form. Motion of charged particles in external electric and magnetic fields.

**(38 Lectures)**

**Electromagnetic radiation:**

Review of retarded potentials. Potentials due to a moving charge: Lienard Wiechert potentials. Electric & Magnetic fields due to a moving charge: Power radiated, Larmor's formula and its relativistic generalisation.

**(15 Lectures)**

**Reference Books:**

- Classical Mechanics, H.Goldstein, C.P. Poole, J.L. Safko, 3rd Edn. 2002,Pearson Education.
  - Mechanics, L. D. Landau and E. M. Lifshitz, 1976, Pergamon.
  - Classical Electrodynamics, J.D. Jackson, 3rd Edn., 1998, Wiley.
  - The Classical Theory of Fields, L.D Landau, E.M Lifshitz, 4th Edn., 2003, Elsevier.
  - Introduction to Electrodynamics, D.J. Griffiths, 2012, Pearson Education.
  - Classical Mechanics: An introduction, Dieter Strauch, 2009, Springer.
  - Solved Problems in classical Mechanics, O.L. Delange and J. Pierrus, 2010, Oxford Press
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COURSES OF STUDY FOR SKILL ENHANCEMENT COURSE 'B. Sc. General'  
PROGRAMME IN "PHYSICS"

**SEMESTER III****SKILL ENHANCEMENT COURSE****1 Paper****Total 100 x 1 = 100 Marks****I. SKILL ENHANCEMENT COURSE SEC 1:**

(Credits: Theory-02)

**Marks : 100 (ESE: 3Hrs) =100****Pass Marks Th ESE = 40**

*Instruction to Question Setter for  
End Semester Examination (ESE):*

*There will be **objective type test** consisting of hundred questions of 1 mark each. Students are required to mark their answer on **OMR Sheet** provided by the University.*

**ELEMENTARY COMPUTER APPLICATION SOFTWARES:**

A Common Syllabus Prescribed by Ranchi University

**Theory: 30 Lectures****Objective of the Course**

*The objective of the course is to generate qualified manpower in the area of Information Technology (IT) and Graphic designing which will enable such person to work seamlessly at any Offices, whether Govt. or Private or for future entrepreneurs in the field of IT.*

**A. INTRODUCTION TO COMPUTER SYSTEM****Basic Computer Concept**

Computer Appreciation - Characteristics of Computers, Input, Output, Storage units, CPU, Computer System. **(1 Lecture)**

**Input and Output Devices**

Input Devices - Keyboard, Mouse, joystick, Scanner, web cam,

Output Devices- Soft copy devices, monitors, projectors, speakers, Hard copy devices, Printers – Dot matrix, inkjet, laser, Plotters. **(4 lectures)**

**Computer Memory and Processors**

Memory hierarchy, Processor registers, Cache memory, Primary memory- RAM, ROM, Secondary storage devices, Magnetic tapes, Floppy disks, hard disks, Optical Drives- CD-ROM, DVD-ROM, CD-R, CD-RW, USB Flash drive, Mass storage devices: USB thumb drive. Managing disk Partitions, File System. Basic Processor Architecture, Processor speed, Types of processor.

**(5 lectures)****Numbers Systems and Logic Gates**

Decimal number system, Binary number system, Octal number system, Hexadecimal number system, Inter-conversion between the number systems. Basic Logic gates-AND, OR, NOT, Universal logic gates- NAND, NOR **(3 lectures)**

**Computer Software**

Computer Software- Relationship between Hardware and Software, System Software, Application Software, Compiler, Names of some high level languages, Free domain software. **(2 Lectures)**

**Internet & its uses**

History of Internet, WWW and Web Browsers: Web Browsing software, Surfing the Internet, Chatting on Internet, Basic of electronic mail, Using Emails, Document handling, Network definition, Common terminologies: LAN, WAN, MAN, Node, Host, Workstation, Bandwidth, Network Components: Servers, Clients, Communication Media. Wireless network

**(3 Lectures)**

**Operating system-Windows**

Operating system and basics of Windows, The User Interface, Using Mouse and Moving Icons on the screen, The My Computer Icon, The Recycle Bin, Status Bar, Start and Menu & Menu-selection, Running an Application, Windows Explorer Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows, Windows Setting, Control Panels, Wall paper and Screen Savers, Setting the date and Sound, Concept of menu Using Help, Advanced Windows, Using right Button of the Mouse, Creating Short cuts, Basics of Window Setup, Notepad, Window Accessories

**(2 Lectures)**

**B. MICROSOFT OFFICE 2007 AND LATEST VERSIONS****Word Processing**

Word processing concepts: saving, closing, Opening an existing document, Selecting text, Editing text, Finding and replacing text, printing documents, Creating and Printing Merged Documents, Character and Paragraph Formatting, Page Design and Layout. Editing and Checking. Correcting spellings. Handling Graphics, Creating Tables and Charts, Document Templates and Wizards, Mail merge and Macros.

**(3 Lectures)**

**Microsoft Excel (Spreadsheet)**

Spreadsheet Concepts, Creating, Saving and Editing a Workbook, Inserting, Deleting Work Sheets, entering data in a cell / formula Copying and Moving from selected cells, handling operators in Formulae, Functions: Mathematical, Logical, statistical, text, financial, Date and Time functions, Using Function Wizard. Formatting a Worksheet: Formatting Cells changing data alignment, changing date, number, character or currency format, changing font, adding borders and colors, Printing worksheets, Charts and Graphs – Creating, Previewing, Modifying Charts. Integrating word processor, spread sheets, web pages. Pivot table, goal seek, Data filter and scenario manager

**(4 Lectures)**

**Microsoft Power Point (Presentation Package)**

Creating, Opening and Saving Presentations, Creating the Look of Your Presentation, Working in Different Views, Working with Slides, Adding and Formatting Text, Formatting Paragraphs, Drawing and Working with Objects, Adding Clip Art and other pictures, Designing Slide Shows, Running and Controlling a Slide Show, Printing Presentations. Creating photo album, Rehearse timing and record narration. Master slides.

**(3 Lectures)**

**Reference Books**

- Nishit Mathur, Fundamentals of Computer , Aph publishing corporation(2010)
  - Misty E. Vermaat, Microsoft word 2013 1<sup>st</sup> Edition (2013).
  - Satish Jain, M.Geeta, MS- Office 2010 Training Guide, BPB publication (2010)
  - Joan Preppernau, Microsoft PowerPoint 2016 step by step, Microsoft press(2015)
  - Douglas E Corner, The Internet Book 4<sup>th</sup> Edition, prentice –Hall(2009)
  - Faithe wempen, word 2016 in depth 1<sup>st</sup> edition, que publishing(2015)
  - Steven welkler, Office 2016 for beginners, Create Space Independent publishing Plateform (2016)
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## SKILL ENHANCEMENT LAB- SEC 1 LAB

### A. MS-WORD LAB ASSIGNMENT

1. Write down the following Paragraph OR any one provided by your teacher;

Without a doubt, the Internet is one of the most important inventions of modern times. The Internet is a global interconnected computer networks which allow each connected computer to share and exchange information with each other. The origins of the Internet can be traced to the creation of Advanced Research Projects Agency Network (ARPANET) as a network of computers under the auspices of the U.S. Department of Defense in 1969.

Apply following effects on The paragraph:

- i. Paragraph **font-size** and **font-type** must be 12 Verdana.
- ii. Paragraph **alignment** must be justified and double line spacing.
- iii. **Highlight** the “(ARPANET)” with green color.
- iv. Make the “Internet” keywords **Bold and Italic**.
- v. Insert any “**WordArt**” and a **symbol** to your document.
- vi. Insert a **clipart** to your document.
- vii. Add following lines to your document:  
Internet, Intranet, Extranet, URL, WWW, Networking, Protocols, HTTP, TCP/IP

2. Create a Table of following fields:

Name, Surname, Age, Gender, Job and apply the following effects

- i. Insert 10 records
- ii. Font size should be 12
- iii. Title size should be 14
- iv. Font type should be Times new Roman
- v. Title color should be blue
- vi. Text color should be black
- vii. Table border should be 2

3. Write a letter on ‘Road Safety’ and send to ‘Multiple Recipients’ using mail merge.

4. Type the paragraph given below:

Today, the Internet is a public, cooperative and self-sustaining facility accessible to hundreds of millions of people worldwide. Physically, the Internet uses a portion of the total resources of the currently existing public telecommunication networks. Technically, what distinguishes the Internet is its use of a set of protocols called TCP/IP (for Transmission Control Protocol/Internet Protocol). Two recent adaptations of Internet technology, the intranet and the extranet, also make use of the TCP/IP protocol. Today, the Internet is a public, cooperative and self-sustaining facility accessible to hundreds of millions of people worldwide. Physically, the Internet uses a portion of the total resources of the currently existing public telecommunication networks. Technically, what distinguishes the Internet is its use of a set of protocols called TCP/IP (for Transmission Control Protocol/ Internet Protocol). Two recent adaptations of Internet technology, the intranet and the extranet, also make use of the TCP/IP protocol.



Apply the following:

- i. Change Internet into Internets at a time
- ii. Highlight TCP/IP in red color
- iii. Replace protocol into protocols
- iv. Find the word "Public"

## **B. MICROSOFT EXCEL LAB ASSIGNMENT**

### **Basic Formatting and Spreadsheet Manipulation**

1. Add rows and columns to an existing spreadsheet
2. Reformat data (center, comma and currency styles, bold, text color)
3. Work with a simple formula (product) and function (sum)

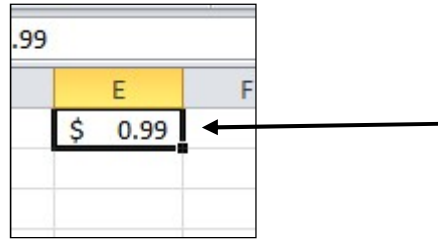
### **Assignment**

1. Create a workbook as shown below.
2. To enter new rows or columns, simply click on the row or column header to select the whole row or column. Then right click with the mouse and choose insert.
3. Add the new row for S Spade with the data that's shown below (between the original rows 7 and 8).
4. Add a column for gender and the data as shown below (between the original columns A and B). Enter the appropriate gender for yourself in the last row.

A	B	C	D
Name	Male/Female	Genre	Number of Songs
J Smith	F	Blues	50
B Doe	M	Country	110
S Spade	F	Country	200
F Zappa	M	Blues	1400
F Zappa	M	Alternative	2300
J Smith	F	Alternative	150
S Spade	F	Blues	1000
B Doe	M	Blues	75
yourname	M	Blues	800

5. Center the data in columns B and C. Do this by selecting the whole column and click the center icon on the ribbon.
6. Bold the data in row 1, the column headings (ensure that the data all remains visible within the column boundaries).
7. Change the font color for row 1 to Blue.
8. Change the format of the data in column D to comma style (no decimal places showing). There is an icon on the home tab that sets it to comma style easily.
9. Add two new column labels to the right of the current columns; **Unit Price** and **Total Cost**. (They will be in columns E and F.) These two columns of data should be currency type so that the dollar sign is shown. There is an icon to quickly format the selected column as currency type.
10. All tunes are \$.99, so enter that value for all rows in Column E. You can copy quickly by using the **Auto Fill** handle and drag that amount down. When you over your mouse over the tiny square in

the bottom right hand corner of the active cell, your mouse shape will become a skinny plus sign, and you can click and drag that cell to make a copy.



11. Calculate Total Cost (column F) as *column D times Column E*. You will type in a formula like this into cell F2: **=D2\*E2** (Be sure to begin the formula with an equal sign)
12. Use the AutoFill (skinny plus sign) again to copy the formula down column F; down to F10. Double check the picture below to make sure yours has the correct values
13. Add a border to all of the cells (A1-f10) using the Borders tool in the Fonts group on the Home Tab.
14. Change the page layout to landscape. Do this by clicking the Page Layout tab on the ribbon and then to Orientation to Landscape.
15. Save the file.
16. Click in cell F11 and Use the sum function or the shortcut icon that looks like  $\Sigma$  to get the total of the Total Cost column.
17. Ensure that the data is all visible within the column boundaries. Make the columns wider if needed.
18. Save the workbook. Your final spreadsheet should look like the following when printed.

Name	Male/Female	Genre	Number of Songs	Unit Price	Total Cost
J Smith	F	Blues	50	\$ 0.99	\$ 49.50
B Doe	M	Country	110	\$ 0.99	\$ 108.90
S Spade	F	Country	200	\$ 0.99	\$ 198.00
F Zappa	M	Blues	1,400	\$ 0.99	\$ 1,386.00
F Zappa	M	Alternative	2,300	\$ 0.99	\$ 2,277.00
S Spade	F	Blues	1,000	\$ 0.99	\$ 990.00
J Smith	F	Alternative	150	\$ 0.99	\$ 148.50
B Doe	M	Blues	75	\$ 0.99	\$ 74.25
yourname	M	Blues	800	\$ 0.99	\$ 792.00

\$ 6,024.15

**Create a sample table given below in Excel**

- Using formula find Total
- Find the maximum value using MAX function from the **Units** column
- Find minimum value from **Total** column

Order Date	Region	Rep	Item	Units	Unit Cost	Total
1/6/2016	East	Jones	Pencil	95	1.99	189.05
1/23/2016	Central	Kivell	Binder	50	19.99	999.50
2/9/2016	Central	Jardine	Pencil	36	4.99	179.64
2/26/2016	Central	Gill	Pen	27	19.99	539.73
3/15/2016	West	Sorvino	Pencil	56	2.99	167.44
4/1/2016	East	Jones	Binder	60	4.99	299.40
4/18/2016	Central	Andrews	Pencil	75	1.99	149.25
5/5/2016	Central	Jardine	Pencil	90	4.99	449.10
5/22/2016	West	Thompson	Pencil	32	1.99	63.68
6/8/2016	East	Jones	Binder	60	8.99	539.40
6/25/2016	Central	Morgan	Pencil	90	4.99	449.10
7/12/2016	East	Howard	Binder	29	1.99	57.71
7/29/2016	East	Parent	Binder	81	19.99	1,619.19
8/15/2016	East	Jones	Pencil	35	4.99	174.65
9/1/2016	Central	Smith	Desk	2	125.00	250.00
9/18/2016	East	Jones	Pen Set	16	15.99	255.84
10/5/2016	Central	Morgan	Binder	28	8.99	251.72
10/22/2016	East	Jones	Pen	64	8.99	575.36
11/8/2016	East	Parent	Pen	15	19.99	299.85
11/25/2016	Central	Kivell	Pen Set	96	4.99	479.04
12/12/2016	Central	Smith	Pencil	67	1.29	86.43
12/29/2016	East	Parent	Pen Set	74	15.99	1,183.26

### **C. MS-POWERPOINT LAB ASSIGNMENT**

#### **Activity 1 : Using Text & Background/Themes**

- i. Create one new slide and insert any text.
- ii. To make your slide more attractive, use the themes or background.
- iii. Make sure it apply for every slide not only one slide.

#### **Activity 2 : Apply Custom Animation On Text**

- i. Use the custom animation to add effects on your text. Set the text move after you click the mouse.
- ii. If you have more than one text, add effects for each of text.

#### **Activity 3 : Insert Image & WordArt**

- i. Insert one new blank slide.
- ii. Choose one pictures or clip art from any source and insert in your new slide.
- iii. Using the WordArt, make a note or title on your picture.
- iv. Use the custom animation again to add effects on your picture and WordArt.

#### **Activity 4 : Insert Text Box**

- i. Insert one new blank slide.
- ii. Use the text box to insert one paragraph of text and adjust your text.

#### **Activity 5 : Insert Smart Art**

- i. Insert one new blank slide.
- ii. Insert the Smart Art and put your text on the Smart Art.

**Activity 6 : Insert Audio**

- i. Back to your first slide and insert one audio on that slide. The audio must play automatically when you show your slide.
- ii. Make sure the speaker also not appear when you show your slide. (the icon).
- iii. The audio must play when you show alls your slide, not only one slide.

**Activity 7 : inserting Video**

- i. Insert one new slide and insert one short video

**Activity 8 : Save File**

- i. Save your file

**Activity 9 : Create Photo Album & Hyperlink**

- i. Insert one new slide and put a text ex: “My Photo Album”
- ii. Create one photo album and adjust your text and your photos
- iii. Save your photo album with a new file
- iv. Make a hyperlink to your photo using the text “My Photo Album”

**Reference Books:**

- Faithe wempen, word 2016 in depth 1<sup>st</sup> edition, que publishing(2015)
  - steven welkler, Office 2016 for bignners, Create Space Independent publishing plateform(2016)
  - Elaine Marmel, office 2016 simplified, 1<sup>st</sup> Edition, John wiley and sons Inc(2016)
  - Patrice-Anne Rutledge, Easy office 2016 1st edition, Que publishing(2016)
-

**SEMESTER IV****SKILL ENHANCEMENT COURSE****1 Paper****Total 100 x 1 = 100 Marks****II. SKILL ENHANCEMENT COURSE:**

(Credits: Theory-02)

**Marks : 100 (ESE 3Hrs) =100****Pass Marks Th ESE = 40*****Instruction to Question Setter for******End Semester Examination (ESE):***

*There will be two group of questions. Group A is compulsory and will contain three questions. Question No.1 will be very short answer type consisting of ten questions of 1 mark each. Question No.2 & 3 will be short answer type of 5 marks. Group B will contain descriptive type six questions of 20 marks each, out of which any four are to answer.*

*Note: There may be subdivisions in each question asked in Theory Examinations.*

**ELECTRICAL CIRCUITS AND NETWORK SKILLS****30 Lectures**

*The aim of this course is to enable the students to design and trouble shoots the electrical circuits, networks and appliances through hands-on mode*

**Basic Electricity Principles:**

Voltage, Current, Resistance, and Power. Ohm's law. Series, parallel, and series-parallel combinations. AC Electricity and DC Electricity. Familiarization with multimeter, voltmeter and ammeter.

**(3 Lectures)****Understanding Electrical Circuits:**

Main electric circuit elements and their combination. Rules to analyze DC sourced electrical circuits. Current and voltage drop across the DC circuit elements. Single-phase and three-phase alternating current sources. Rules to analyze AC sourced electrical circuits. Real, imaginary and complex power components of AC source. Power factor. Saving energy and money.

**(4 Lectures)****Electrical Drawing and Symbols:**

Drawing symbols. Blueprints. Reading Schematics. Ladder diagrams. Electrical Schematics. Power circuits. Control circuits. Reading of circuit schematics. Tracking the connections of elements and identify current flow and voltage drop.

**(4 Lectures)****Generators and Transformers:**

DC Power sources. AC/DC generators. Inductance, capacitance, and impedance. Operation of transformers.

**(3 Lectures)****Electric Motors:**

Single-phase, three-phase & DC motors. Basic design. Interfacing DC or AC sources to control heaters & motors. Speed & power of ac motor.

**(4 Lectures)**

**Solid-State Devices:**

Resistors, inductors and capacitors. Diode and rectifiers. Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources

**(3 Lectures)**

**Electrical Protection:**

Relays. Fuses and disconnect switches. Circuit breakers. Overload devices. Ground-fault protection. Grounding and isolating. Phase reversal. Surge protection. Interfacing DC or AC sources to control elements (relay protection device)

**(4 Lectures)**

**Electrical Wiring:**

Different types of conductors and cables. Basics of wiring-Star and delta connection. Voltage drop and losses across cables and conductors. Instruments to measure current, voltage, power in DC and AC circuits. Insulation. Solid and stranded cable. Conduit. Cable trays. Splices: wirenuts, crimps, terminal blocks, split bolts, and solder. Preparation of extension board.

**(5 Lectures)**

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**SKILL ENHANCEMENT LAB- SEC 2 LAB****Laboratory Exercises:**

1. Use of multimeter, voltmeter and ammeter
2. To observe current and voltage drop across the DC circuit elements.
3. To track the connections of elements and identify current flow and voltage drop.
4. To observe the working of transformer under no load and full load condition
5. Use of diode as half wave, full wave and bridge rectifier
6. To observe the response of inductor and capacitor with DC or AC sources
7. To understand the importance of interfacing DC or AC sources to relay protection device
8. To prepare an extension board with more than one input terminal (3 pin socket) and check its working

**Reference Books:**

- A text book in Electrical Technology - B L Theraja - S Chand & Co.
  - A text book of Electrical Technology - A K Theraja
  - Performance and design of AC machines - M G Say ELBS Edn.
-

**SEMESTER V****SKILL ENHANCEMENT COURSE****1 Paper****Total 100 x 1 = 100 Marks****III. SKILL ENHANCEMENT COURSE:**

(Credits: Theory-02)

**Marks : 100 (ESE 3Hrs) =100****Pass Marks Th ESE = 40*****Instruction to Question Setter for******End Semester Examination (ESE):***

*There will be two group of questions. **Group A is compulsory** and will contain three questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 & 3 will be short answer type** of 5 marks. **Group B will contain descriptive type** six questions of 20 marks each, out of which any four are to answer.*

***Note:** There may be subdivisions in each question asked in Theory Examinations.*

**BASIC INSTRUMENTATION SKILLS****30 Lectures**

*This course is to get exposure with various aspects of instruments and their usage through hands-on mode. Experiments listed below are to be done in continuation of the topics.*

**Basic of Measurement:**

Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects. **Multimeter:** Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance.

**(4 Lectures)****Electronic Voltmeter:**

Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance. **AC millivoltmeter:** Type of AC millivoltmeters: Amplifier- rectifier, and rectifier- amplifier. Block diagram ac millivoltmeter, specifications and their significance.

**(4 Lectures)****Cathode Ray Oscilloscope:**

Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance.

**(6 Lectures)**

Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.

**(3 Lectures)**

**Signal Generators and Analysis Instruments:**

Block diagram, explanation and specifications of low frequency signal generators. pulse generator, and function generator. Brief idea for testing, specifications. Distortion factor meter, wave analysis.

(4 Lectures)

**Impedance Bridges & Q-Meters:**

Block diagram of bridge. working principles of basic (balancing type) RLC bridge. Specifications of RLC bridge. Block diagram & working principles of a Q- Meter. Digital LCR bridges.

(3 Lectures)

**Digital Instruments:**

Principle and working of digital meters. Comparison of analog & digital instruments. Characteristics of a digital meter. Working principles of digital voltmeter.

(3 Lectures)

**Digital Multimeter:**

Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution.

(3 Lectures)

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**SKILL ENHANCEMENT LAB- SEC 3 LAB**

**The test of lab skills will be of the following test items:**

1. Use of an oscilloscope.
2. CRO as a versatile measuring device.
3. Circuit tracing of Laboratory electronic equipment,
4. Use of Digital multimeter/VTVM for measuring voltages
5. Circuit tracing of Laboratory electronic equipment,
6. Winding a coil / transformer.
7. Study the layout of receiver circuit.
8. Trouble shooting a circuit
9. Balancing of bridges

**LABORATORY EXERCISES:**

1. To observe the loading effect of a multimeter while measuring voltage across a low resistance and high resistance.
2. To observe the limitations of a multimeter for measuring high frequency voltage and currents.

Session 2019-22 onwards



3. To measure Q of a coil and its dependence on frequency, using a Q- meter.
4. Measurement of voltage, frequency, time period and phase angle using CRO.
5. Measurement of time period, frequency, average period using universal counter/ frequency counter.
6. Measurement of rise, fall and delay times using a CRO.
7. Measurement of distortion of a RF signal generator using distortion factor meter.
8. Measurement of R, L and C using a LCR bridge/ universal bridge.

**Open Ended Experiments:**

1. Using a Dual Trace Oscilloscope
2. Converting the range of a given measuring instrument (voltmeter, ammeter)

**Reference Books:**

- A text book in Electrical Technology - B L Theraja - S Chand and Co.
  - Performance and design of AC machines - M G Say ELBS Edn.
  - Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
  - Logic circuit design, Shimon P. Vingron, 2012, Springer.
  - Digital Electronics, Subrata Ghoshal, 2012, Cengage Learning.
  - Electronic Devices and circuits, S. Salivahanan & N. S.Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill
  - Electronic circuits: Handbook of design and applications, U.Tietze, Ch.Schenk, 2008, Springer
  - Electronic Devices, 7/e Thomas L. Floyd, 2008, Pearson India
-

**SEMESTER VI****SKILL ENHANCEMENT COURSE****1 Paper****Total 100 x 1 = 100 Marks****IV. SKILL ENHANCEMENT COURSE:**

(Credits: Theory-02)

**Marks : 100 (ESE 3Hrs) =100****Pass Marks Th ESE = 40*****Instruction to Question Setter for******End Semester Examination (ESE):***

*There will be two group of questions. **Group A is compulsory** and will contain three questions. **Question No.1 will be very short answer type** consisting of ten questions of 1 mark each. **Question No.2 & 3 will be short answer type** of 5 marks. **Group B will contain descriptive type** six questions of 20 marks each, out of which any four are to answer.*

*Note: There may be subdivisions in each question asked in Theory Examinations.*

**RENEWABLE ENERGY AND ENERGY HARVESTING****30 Lectures**

*The aim of this course is not just to impart theoretical knowledge to the students but to provide them with exposure and hands-on learning wherever possible*

**Fossil fuels and Alternate Sources of energy:**

Fossil fuels and Nuclear Energy, their limitation, need of renewable energy, non-conventional energy sources. An overview of developments in Offshore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar energy, biomass, biochemical conversion, biogas generation, geothermal energy tidal energy, Hydroelectricity.

**(3 Lectures)****Solar energy:**

Solar energy, its importance, storage of solar energy, solar pond, non convective solar pond, applications of solar pond and solar energy, solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning. Need and characteristics of photovoltaic (PV) systems, PV models and equivalent circuits, and sun tracking systems.

**(6 Lectures)****Wind Energy harvesting:**

Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces, and grid interconnection topologies.

**(3 Lectures)****Ocean Energy:**

Ocean Energy Potential against Wind and Solar, Wave Characteristics and Statistics, Wave Energy Devices.

**(3 Lectures)**

Tide characteristics and Statistics, Tide Energy Technologies, Ocean Thermal Energy, Osmotic Power, Ocean Bio-mass.

**(2 Lectures)****Geothermal Energy:**

Geothermal Resources, Geothermal Technologies.

**(2 Lectures)**

Session 2019-22 onwards

**Hydro Energy:**

Hydropower resources, hydropower technologies, environmental impact of hydro power sources.

(2 Lectures)

**Piezoelectric Energy harvesting:**

Introduction, Physics and characteristics of piezoelectric effect, materials and mathematical description of piezoelectricity, Piezoelectric parameters and modeling piezoelectric generators, Piezoelectric energy harvesting applications, Human power

(4 Lectures)

**Electromagnetic Energy Harvesting:**

Linear generators, physics mathematical models, recent applications

(2 Lectures)

Carbon captured technologies, cell, batteries, power consumption

(2 Lectures)

Environmental issues and Renewable sources of energy, sustainability.

(1 Lecture)

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**SKILL ENHANCEMENT LAB- SEC 4 LAB****Demonstrations and Experiments:**

1. Demonstration of Training modules on Solar energy, wind energy, etc.
2. Conversion of vibration to voltage using piezoelectric materials
3. Conversion of thermal energy into voltage using thermoelectric modules.

**Reference Books:**

- Non-conventional energy sources - G.D Rai - Khanna Publishers, New Delhi
  - Solar energy - M P Agarwal - S Chand and Co. Ltd.
  - Solar energy - Suhas P Sukhative Tata McGraw - Hill Publishing Company Ltd.
  - Godfrey Boyle, "Renewable Energy, Power for a sustainable future", 2004, Oxford University Press, in association with The Open University.
  - Dr. P Jayakumar, Solar Energy: Resource Assesment Handbook, 2009
  - J.Balfour, M.Shaw and S. Jarosek, Photovoltaics, Lawrence J Goodrich (USA).
  - [http://en.wikipedia.org/wiki/Renewable\\_energy](http://en.wikipedia.org/wiki/Renewable_energy)
-

SAMPLE CALCULATION FOR SGPA & CGPA FOR UNDERGRADUATE 'B.Sc./B.A./B.Com  
General' PROGRAMME

**Distribution of Credits Semester wise for Undergraduate Courses**

**Table B-1: UG (B.A./ B.Sc./B.Com. Programme)**

**Semester wise distribution of 120 Credits**

	<b>CC</b>	<b>AECC</b>	<b>GE</b>	<b>SEC</b>	<b>DSE</b>	<b>Total Credits</b>
Semester I	18	02				20
Semester II	18	02				20
Semester III	18			02		20
Semester IV	18			02		20
Semester V				02	18	20
Semester VI				02	18	20
	<b>72</b>	<b>04</b>		<b>08</b>	<b>36</b>	<b>120</b>

CC=Core Course; AECC=Ability Enhancement Compulsory Course; GE=Generic Elective; SEC=Skill Enhancement Course; DSE=Discipline Specific Elective

**Table B-2: Sample calculation for SGPA for B.A./B.Sc./B.Com. Program**

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit X Grade)	SGPA (Credit Point/Credit)
<b>Semester I</b>					
DSC - 1A	06	B	6	36	
DSC - 2A	06	B+	7	42	
DSC - 3A	06	C	5	30	
AECC – 1	02	B	6	12	
<b>Total</b>	<b>20</b>			<b>120</b>	<b>6.0 (120/20)</b>
<b>Semester II</b>					
DSC - 1B	06	B	6	36	
DSC - 2B	06	B	6	36	
DSC - 3B	06	C	5	30	
AECC – 2	02	A+	9	18	
<b>Total</b>	<b>20</b>			<b>120</b>	<b>6.0 (120/20)</b>
<b>Semester III</b>					
DSC - 1C	06	A	8	48	
DSC - 2C	06	A+	9	54	
DSC - 3C	06	A	8	48	
SEC – 1	02	A	8	16	
<b>Total</b>	<b>20</b>			<b>166</b>	<b>8.3 (166/20)</b>
<b>Semester IV</b>					
DSC - 1D	06	C	5	30	
DSC - 2D	06	B	6	36	
DSC - 3D	06	B+	7	42	
SEC - 2	02	A+	9	18	
<b>Total</b>	<b>20</b>			<b>126</b>	<b>6.3 (126/20)</b>
<b>Semester V</b>					
DSE - 1A	06	B	6	36	
DSE - 2A	06	A+	9	54	
DSE - 3A	06	A	8	48	
SEC – 3	02	B	6	12	
<b>Total</b>	<b>20</b>			<b>150</b>	<b>7.5 (150/20)</b>
<b>Semester VI</b>					
DSE - 1B	06	B+	7	42	
DSE - 1B	06	B	6	36	
DSE - 1B	06	C	5	30	
SEC - 4	02	C	5	10	
<b>Total</b>	<b>20</b>			<b>118</b>	<b>5.9 (118/20)</b>
<b>CGPA</b>					
<b>Grand Total</b>	<b>120</b>			<b>800</b>	<b>6.67 (800/120)</b>

**Table B- 3: Sample calculation for CGPA for B.A./B.Sc./B.Com. Program**

Semester I	Semester II	Semester III	Semester IV	Semester V	Semester VI
Credit:20; SGPA: 6.0	Credit:20; SGPA: 6.0	Credit:20; SGPA: 8.3	Credit:20; SGPA: 6.3	Credit:20; SGPA: 7.5	Credit:20; SGPA: 5.9

**Thus CGPA= (20x6.0+20x6.0+20x8.3+20x6.3+20x7.5+20x5.9)/120=6.67**

## MARKS DISTRIBUTION FOR EXAMINATIONS AND FORMAT OF QUESTION PAPERS

**Marks Distribution of End Semester Theory Examinations:****Table No. C1:** Marks distribution of Theory Examinations of End Semester

Topic	Code	Full Marks	Pass Marks	Time	Group-A# (Very short answer type Compulsory Questions) No. of Questions x Marks = F.M.	Group-B (Descriptive Questions with Choices ) No. of Questions x Marks = F.M.	Total No. of Questions to Set	
							Group A#	Group B
End Sem	T75	75	30	3 Hrs	Q.No.1 (10x1) + 1x5 =15	4 (out of 6) x15 =60	2	6
	T100	100	40	3 Hrs	Q.No.1 (10x1) + 2x5 =20	4 (out of 6) x20 =80	3	6
	T50 +T50	50X2=100	20	3 Hrs	2 x5 =10	2 (out of 3) x20 =40	2	3

# Question No.1 in Group-A carries 10 very short answer type 1 Mark Questions.

**Marks Distribution of Mid/End Semester Practical Examinations:****Table No. C2:** Marks distribution of Practical Examinations of End Semester

Topic	Code	Full Marks	Pass Marks	Time	Distribution of Marks			Total No. of Questions to Set
					Experiment	Record	Viva	
End Sem	P25	25	10	3 Hrs	15	5	5	
	P50	50	20	3 Hrs	30	10	10	Pr. with components of both papers
	P75	75	30	3 Hrs	45	15	15	Pr. with components of all three papers
	P100	100	40	3 Hrs	60	20	20	Pr. with components of all four papers

**Abbreviations :** T= Theory Examination, P= Practical Examination.

**Mid Sem\*** : There will be 15 Marks Theory Examination in Practical Subjects and 25 Marks Theory Examination in Non-Practical Subjects/ Papers. 25 Marks Theory Examination may include 10 Marks questions from Assignment/ Project/ Tutorial where ever applicable.

**Note** : There may be subdivisions in each question asked in Theory Examinations.

## FORMAT OF QUESTION PAPER FOR END SEM EXAMINATION

OF

AECC NH + MB COMMUNICATION



## Ranchi University, Ranchi

End Sem No.Exam Year

**Subject/ Code**

**F.M.** =50**P.M.**=20**Time**=1.5Hrs.

**General Instructions:**

- i. **Group A** carries short answer type **compulsory** questions.  
(खंड 'A' में लघु उत्तरीय अनिवार्य प्रश्न हैं।)
- ii. **Answer 2 out of 3** subjective/ descriptive questions given in **Group B**.  
(खंड 'B' के तीन में से किन्हीं दो विषयनिष्ठ/ वर्णनात्मक प्रश्नों के उत्तर दें।)
- iii. Answer in your own words as far as practicable.  
(यथासंभव अपने शब्दों में उत्तर दें।)
- iv. Answer all sub parts of a question at one place.  
(एक प्रश्न के सभी भागों के उत्तर एक साथ लिखें।)
- v. Numbers in right indicate full marks of the question.  
(पूर्णांक दायीं ओर लिखे गये हैं।)

**Group A**

- |         |  |     |
|---------|--|-----|
| 1. .... |  | [5] |
| 2. .... |  | [5] |

**Group B**

- |         |  |      |
|---------|--|------|
| 3. .... |  | [20] |
| 4. .... |  | [20] |
| 5. .... |  | [20] |

**Note:** There may be subdivisions in each question asked in Theory Examination.

FORMAT OF QUESTION PAPER FOR END SEM EXAMINATION  
OF  
SUBJECTS WITHOUT PRACTICAL



## Ranchi University, Ranchi

End Sem No.Exam Year**Subject/ Code****F.M.** =75**P.M.** =40 (Including Mid Sem)**Time**=3Hrs.**General Instructions:**

- i. **Group A** carries very short answer type **compulsory** questions.
- ii. **Answer 4 out of 6** subjective/ descriptive questions given in **Group B**.  
(खंड 'B' के छः में से किन्हीं चार विषयनिष्ठ/ वर्णनात्मक प्रश्नों के उत्तर दें।)
- iii. Answer in your own words as far as practicable.  
(यथासंभव अपने शब्दों में उत्तर दें।)
- iv. Answer all sub parts of a question at one place.  
(एक प्रश्न के सभी भागों के उत्तर एक साथ लिखें।)
- v. Numbers in right indicate full marks of the question.  
(पूर्णांक दायीं ओर लिखे गये हैं।)

**Group A**

1. [10x1=10]
- i. ....
  - ii. ....
  - iii. ....
  - iv. ....
  - v. ....
  - vi. ....
  - vii. ....
  - viii. ....
  - ix. ....
  - x. ....

2. .... [5]

**Group B**

3. .... [15]
4. .... [15]
5. .... [15]
6. .... [15]
7. .... [15]
8. .... [15]

**Note:** There may be subdivisions in each question asked in Theory Examination.



## FORMAT OF QUESTION PAPER FOR END SEM EXAMINATION

OF

GE, SEC, GENERAL &amp; AECC HINDI/ ENGLISH COMMUNICATION



## Ranchi University, Ranchi

End Sem No.Exam Year

**Subject/ Code**

**F.M.** =100**P.M.** =40**Time**=3Hrs.

**General Instructions:**

- i. **Group A** carries very short answer type **compulsory** questions.
- ii. **Answer 4 out of 6** subjective/ descriptive questions given in **Group B**.  
(खंड 'B' के छः में से किन्हीं चार विषयनिष्ठ/ वर्णनात्मक प्रश्नों के उत्तर दें।)
- iii. Answer in your own words as far as practicable.  
(यथासंभव अपने शब्दों में उत्तर दें।)
- iv. Answer all sub parts of a question at one place.  
(एक प्रश्न के सभी भागों के उत्तर एक साथ लिखें।)
- v. Numbers in right indicate full marks of the question.  
(पूर्णांक दायीं ओर लिखे गये हैं।)

**Group A**

- |    |            |           |
|----|------------|-----------|
| 1. |            | [10x1=10] |
|    | i. ....    |           |
|    | ii. ....   |           |
|    | iii. ....  |           |
|    | iv. ....   |           |
|    | v. ....    |           |
|    | vi. ....   |           |
|    | vii. ....  |           |
|    | viii. .... |           |
|    | ix. ....   |           |
|    | x. ....    |           |
| 2. | .....      | [5]       |
| 3. | .....      | [5]       |

**Group B**

- |    |       |      |
|----|-------|------|
| 4. | ..... | [20] |
| 5. | ..... | [20] |
| 6. | ..... | [20] |
| 7. | ..... | [20] |
| 8. | ..... | [20] |
| 9. | ..... | [20] |

**Note:** There may be subdivisions in each question asked in Theory Examination.