MODIFIED CBCS CURRICULUM OF

MATHEMATICS GENERAL PROGRAMME

SUBJECT CODE = 00

FOR UNDER GRADUATE COURSES UNDER RANCHI UNIVERSITY

Implemented from
Academic Session 2017-2020

Members of Board of Studies of CBCS Under- Graduate Syllabus as per Guidelines of the Ranchi University, Ranchi.

1. **Chairman –**

   Dr. A.K. Mahato
   Professor & Head,
   University Department of Mathematics, Ranchi University, Ranchi

2. **Internal Members-**

   i. **Dr. M. M. P. Singh**
   Professor,
   University Department of Mathematics, Ranchi University, Ranchi

   ii. **Dr. M. K. Singh**
   Professor,
   University Department of Mathematics, Ranchi University, Ranchi

   iii. **Dr. Shahdeo Mahto**
   Associate Professor
   University Department of Mathematics, Ranchi University, Ranchi

   iv. **Dr. C. S. P. Lugun**
   Associate Professor,
   University Department of Mathematics, Ranchi University, Ranchi

3. **External Members :-**

   i. **Dr. S. K. Agarwal**
   Professor and Head,
   University Department of Mathematics, Vinoba Bhave University, Hazaribagh

   ii. **Dr. S. K. Mohan**
   Associate Professor,
   University Department of Mathematics, Nilamber Pitamber University, Medininagar

4. **Special Invitee:**

   i. **Dr. N. K. Agarwal**
   Prof. (Retd.)
   University Department of Mathematics, Ranchi University, Ranchi

Submitted for publication at R.U. website

8/7/18

Head,
Department of Mathematics
Ranchi University, Ranchi

Contents

COURSE STUCTURE 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	Credits Theory + Tutorial
I. Core Course	**(DSC A to D)**		
04 Courses from each of the 03 discipline of choice			
Theory	4x3=12 Papers	12X4=48	12X5=60
Practical/Tutorial*	4x3=12 Papers	12X2=24	12X1=12
II. Elective Course (EC)			
A. Discipline Specific Elective	**(DSE A & B)**		
02 Courses from each of the 03 discipline of choice			
Theory	2X3=6 Papers	6X4=24	6X5=30
Practical/ Tutorial*	2X3=6 Papers	6X2=12	6X1=6
III. Ability Enhancement Compulsory Courses (AECC)			
1. English/ Hindi Communication/ NH+MB/ 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	**(SEC 1, 2, 3 & 4)** 4 Papers	4X2=8	4X2=8
	Total Credit = 120		**= 120**

Table A -2: Course structure for B.Sc./ B.A./ B.Com. (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)	**20 Credits**
Sem-II	DSC-1B, DSC-2B, DSC-3B (6+6+6=18 Credits)	---	EVS (02 Credits)	**20 Credits**
Sem-III	DSC-1C, DSC-2C, DSC-3C (6+6+6=18 Credits)	---	SEC-1 (02 Credits)	**20 Credits**
Sem-IV	DSC-1D, DSC-2D, DSC-3D (6+6+6=18 Credits)	---	SEC-2 (02 Credits)	**20 Credits**
Sem-V	---	DSE-1A, DSE-2A, DSE-3A (6+6+6=18 Credits)	SEC-3 (02 Credits)	**20 Credits**
Sem-VI	---	DSE-1B, DSE-2B, DSE-3B (6+6+6=18 Credits)	SEC-4 (02 Credits)	**20 Credits**
				Total = 120 Credits

COURSES OF STUDY FOR UNDERGRADUATE **'B. A./ B.Sc. General'** PROGRAMME

Table A -3: Basic Course structure for ARTS/ 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
I	DSC1A DSC2A DSC3A	Core Subject 1; Paper A Core Subject 2; Paper A Core Subject 3; Paper A			Compulsory Language Communication ENG/ Hindi/ NH + MB	
II	DSC1B DSC2B DSC3B	Core Subject 1; Paper B Core Subject 2; Paper B Core Subject 3; Paper B			EVS	Environmental Science
III	DSC1C DSC2C DSC3C	Core Subject 1; Paper C Core Subject 2; Paper C Core Subject 3; Paper C			SEC1	SEC1: Elementary Computer Application Softwares +**Lab**
IV	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
V			DSE1A DSE2A DSE3A	Core Subject 1 Core Subject 2 Core Subject 3	SEC3	SEC3 of same subject opted in Sem III;
V			DSE1A DSE2A DSE3A	Core Subject 1 Core Subject 2 Core Subject 3	SEC3	SEC4 of same subject opted in Sem III;

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

Semester	Course (Core Courses)		Allied (Elective Courses)		Ability Enhancement (Compulsory Courses)	
	Code	4 Papers	Code	2 Papers	Code	2 + 4 Papers
I	DSC-A	Differential Calculus and Coordinate Geometry 2D +**T**			Compulsory Language Communication	
II	DSC-B	Integral Calculus, Vector Calculus and Trigonometry +**T**			EVS	Environmental Science
III	DSC-C	Real Analysis I, Group Theory and Differential Equations +**T**			SEC1	Elementary Computer Application Software **+Lab**
IV	DSC-D	Real Analysis II, Complex Variable, Set Theory and Matrices +**T**			SEC2	Graph Theory +**T**
V			DSE-A	Matrices +**T**	SEC3	Theory of Equations +**T**
VI			DSE-B	Complex Analysis +**T**	SEC4	Probability & Statistics +**T**

Table A-5.1: Subject Combinations allowed for B. A. General Programme:

S.No.	Note: Any Three Subjects may be opted but only One from S.No.1		
1	Anthropology/ Geography/ Psychology/ Home Science	**13**	Bengali
2	Geography	**14**	Urdu
3	History	**15**	Sanskrit
4	Political Science	**16**	Ho
5	Psychology	**17**	Kharia
6	Sociology	**18**	Khortha
7	Economics	**19**	Kurmali
8	Anthropology	**20**	Kurux
9	Philosophy	**21**	Mundari
10	Mathematics	**22**	Nagpuri
11	Hindi	**23**	Panch Pargania
12	English	**24**	Santhali

Table A-5.2: Subject Combinations allowed for B. Sc. General Programme:

	Subject 1	Subject 2	Subject 3
1	Mathematics	Physics	Chemistry
2	Mathematics	Physics	Geology
3	Mathematics	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	Differential Calculus and Coordinate Geometry 2D +**T**		100	
	AECC	Language Communication		100	
II	DSC-B	Integral Calculus, Vector Calculus and Trigonometry +**T**		100	
	AECC	EVS		100	
III	DSC-C	Real Analysis I, Group Theory and Differential Equations +**T**		100	
IV	DSC-D	Real Analysis II, Complex Variable, Set Theory and Matrices +**T**		100	
V	DSE-A	Matrices +**T**		100	
VI	DSE-B	Complex Analysis +**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	Graph Theory **+T**		100	
V	SEC 3	Theory of Equations **+T**		100	
VI	SEC 4	Probability and Statistics **+T**		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
(Refer AECC Curriculum of Ranchi University)

I. CORE COURSE –DSC A: (Credits: Theory-05, Tutorial-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.*

DIFFERENTIAL CALCULUS AND COORDINATE GEOMETRY 2D

Theory: 75 Lectures, Tutorial: 15 Lectures

UNIT-1 Differential Calculus

Successive Differentiation, nth order Derivative of Standard Function. Leibnitz's Theorem. Taylor's and Macularuins's series expansions of functions. Applications of Taylors's and Maclaurins' Series. Tangent and Normal, (Cartesian, Parametric form), Angle between two Curves. Length of tangent, Normal, Sub Tangent, Subnormal in Cartesian Forms. Partial Differention, Eulers' Theorem, Curvature. Asymptotes. Maxima and Minima of functions of two variables.

UNIT-II – COORDINATE GEOMETRY 2D

Change of Rectangular Axes, Rotation and Shifting of Origin, Transformation of General Equation of the Second Degree. Conditions for General Equation of Second Degree to Represent a Parabola, Ellipse and Hyperbola. Equations of the Tangent and Normal to a Curve via calculus. Polar Equation.

Books Recommended:

- Differential Calculus: A Das Gupta & S B Prasad.
- Differential Calculus: Lalji Prasad.
- Coordinate Geometry: A Das Gupta.
- Coordinate Geometry: Lalji Prasad.

SEMESTER II **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.*

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 :

Forest ecosystem
Grassland ecosystem
Desert ecosystem
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:

- 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-05, Tutorial-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.*

INTEGRAL CALCULUS, VECTOR CALCULUS AND TRIGONOMETRY

Theory: 75 Lectures, Tutorial: 15 Lectures

UNIT I - INTEGRAL CALCULUS

Integration of rational and irrational functions. Integration by substitution, by parts, partial fractions, Integration by transformations, Integration by substitution, Integration by parts.

Evaluation of definite integrals, reduction formulae, curve tracing, length and area, Surface area and volume of solids of revolution.

UNIT II – VECTOR CALCULUS & TRIGONOMETRY

Scalar and Vector point functions, vector function of scalar variables, Continuity of a vector function. Differentiation of a vector with respect to the scalar variable "t". Differentiation of a vector function. Derivatives of a sum of vectors, derivatives of a product of vectors (both scalar and vector products).

Gradient, Divergence and curl and second order vector differential operators in Cartesian coordinates systems.

Demoivre's Theorem and applications.

Books Recommended:

- Integral Calculus: Dasgupta & Prasad.
- integral Calculus: Lalji Prasad.
- Vector Calculus: Dasgupta & Prasad.
- Vector calculus: Lalji Prasad.
- Trigonometry : Dasgupta & Prasad.
- Trigonometry : lalji Prasad.

SEMESTER III **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-05, Tutorial-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.*

REAL ANALYSIS-I, GROUP THEORY AND DIFFERENTIAL EQUATIONS

Theory: 75 Lectures, Tutorial: 15 Lectures

UNIT I – REAL ANALYSIS-I

Sequence: Definition, Bounds, Limit of a sequence, Monotonic Sequences and their Convergence, Algebraic operations and limits, Cauchy Sequence, General principle of convergence of a sequence.

Series: Definition, Convergent Series, Divergent Series, Pringsheim's theorem, Comparison tests, Cauchy,s root test , D'Alembert's ratio test, Alternating series and Leibnitz test, Absolutely convergent series.

UNIT II - GROUP THEORY & DIFFERENTIAL EQUATIONS

GROUP THEORY
Binary operations, Notion of group, Abelian group and non-Abelian group with examples. Uniqueness of identity element and inverse elements in a group, different ways of defining a group, concept of Subgroup and cyclic group, Cosets, Lagrange's theorem.

DIFFERENTIAL EQUATIONS
Differential equations of first order and higher degree, Clairaut's form, singular solution, orthogonal trajectories.
Linear Equation with constant co-efficients, Homogenous linear equations with variable coefficients.
Simultaneous equation s $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ and total differential equation

$P\,dx + Q\,dy + R\,dz = 0$ together with their geometric significance.

Books Recommended:

- Real Analysis: Shanti Narayan & M D Raisinghania.
- Real Analysis: Lalji Prasad.
- Abstract algebra: A R vashishtha
- Modern Algebra: Lalji Prasad.
- Differential Equations: M D Raisinghania.

SEMESTER IV 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-05, Tutorial-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.*

REAL ANALYSIS-II, COMPLEX VARIABLE, SET THEORY AND MATRICES

Theory: 75 Lectures, Tutorial: 15 Lectures

UNIT-I – REAL ANALYSIS II
Riemann Integration, definition, Oscillatory sum and integrability condition. Integrability of monotonic and continuous functions. Fundamental theorem of integral calculus.

UNIT-II – COMPLEX VARIABLE
Real Functions of Two Variables: Simultaneous and Iteratd limits: Continuity , Partial Derivatives, Differentiability and related Necessary and Sufficient conditions. Functions of Complex variables Limit, Continuity, Derivative, Cauchy – Reiemann Equations, Analytic Function, Harmonic function.

UNIT III - SET THEORY
Indexed Family of Sets, Generalized Set of Operations & Demorgan's Laws, Set mapping, Countable and Uncountable Sets, Partition of a Set, Equivalence relation and related Fundamental Theorem of Partition. Partial Order Relation and related concepts of u.b., l.b., Inf., Sup, Maximal Element, Minimal Element and Lattice (Definition and Examples only).

UNIT IV - MATRICES
Definitions, Operations on Matrices, Matrix Algebra, Type of Matrices, Transpose, Adjoint and Inverse of a matrix, Solution of system of linear equations.

Books Recommended:

- Real Analysis, Shanti Narayan & M D Raisinghania
- Real Analysis: Lalji Prasad.
- Complex Variables: J N Sharma.
- Set Theory: K K Jha
- Matrices: A. R. Vasishtha

SEMESTER V 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.

I. MATHEMATICS SPECIFIC (DSE A): (Credits: Theory-05, Tutorial-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.*

MATRICES **Theory: 75 Lectures, Tutorial: 15 Lectures**

R, R_2, R_3 as vector spaces over R. Standard basis for each of them. Concept of Linear Independence and examples of different bases.

Subspaces of R_2, R_3. Translation, Dilation, Rotation, Reflection in a point, line and plane. Matrix form of basic geometric transformations. Interpretation of eigen values and eigenvectors for such transformations and eigen spaces as invariant subspaces. Matrices in diagonal form. Reduction to diagonal form upto matrices of order 3.

Computation of matrix inverses using elementary row operations. Rank of matrix. Solutions of a system of linear equations using matrices. Illustrative examples of above concepts from Geometry, Physics, Chemistry, Combinatorics and Statistics.

Books Recommended:

- A.I. Kostrikin, *Introduction to Algebra*, Springer Verlag, 1984.
- S. H. Friedberg, A. L. Insel and L.E. Spence, *Linear Algebra*, Prentice Hall of India Pvt. Ltd., New Delhi, 2004.
- Richard Bronson, Theory and Problems of Matrix Operations, Tata McGraw Hill, 1989.

SEMESTER VI 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. MATHEMATICS SPECIFIC (DSE B): (Credits: Theory-05, Tutorial-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.*

COMPLEX ANALYSIS **Theory: 75 Lectures, Tutorial: 15 Lectures**

Limits, Limits involving the point at infinity, continuity. Properties of complex numbers, regions in the complex plane, functions of complex variable, mappings. Derivatives, differentiation formulas, Cauchy-Riemann equations, sufficient conditions for differentiability.

Analytic functions, examples of analytic functions, exponential function, Logarithmic function, trigonometric function, derivatives of functions, definite integrals of functions. Contours, Contour integrals and its examples, upper bounds for moduli of contour integrals. Cauchy- Goursat theorem, Cauchy integral formula.

Liouville's theorem and the fundamental theorem of algebra. Convergence of sequences and series, Taylor series and its examples.

Laurent series and its examples, absolute and uniform convergence of power series.

Books Recommended

- James Ward Brown and Ruel V. Churchill, *Complex Variables and Applications*, 8th Ed., McGraw – Hill International Edition, 2009.
- Joseph Bak and Donald J. Newman, *Complex analysis,* 2nd Ed., Undergraduate Texts in Mathematics, Springer-Verlag New York, Inc., New York, 1997.

COURSES OF STUDY FOR **SKILL ENHANCEMENT COURSE 'B.Sc./ B. A. General'** PROGRAMME IN **"MATHEMATICS"**

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: Severs, 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 1st 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 4th Edition, prentice –Hall(2009)
- Faithe wempen, word 2016 in depth 1st edition, que publishing(2015)
- Steven welkler, Office 2016 for beginners, Create Space Independent publishing Plateform (2016)

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. Heilight TCP/IP in red color
iii. Replace protocol into protocols
iv. Find the word "Public"

B. MICROSOFT EXCEL LAB ASSİGNMENT

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)

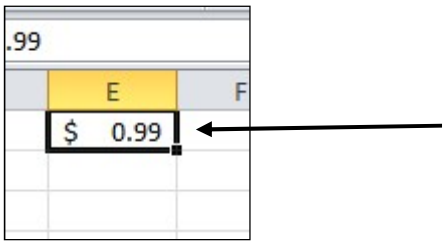
Assignment

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 ∑ 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 1st edition, que publishing(2015)
- steven welkler, Office 2016 for bignners, Create Space Independent publishing plateform(2016)
- Elaine Marmel, office 2016 simplified, 1st 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 SEC 2: (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.*

GRAPH THEORY **Theory: 30 Lectures**

UNIT-1

Definition, Examples and Basic Properties of Graphs, Pseudo graphs, Complete graphs, bipartite graph, isomorphism of graphs, paths and circuits.

UNIT-2

Eulerian Circuits, Hamiltonian Cycles, Adjacency Matrix, Weighted Graph, Traveling Salesman's Problem, Shortest Path, Dijkstra's Algorithm.

Books Recommended::

- B.A. Davey and H.A. Priestley, Introduction to Lattices and Order, Cambridge University Press, Cambridge, 1990.
- Edgar G. Goodaire and Michael M. Parmenter, Discrete Mathematics, weighted graph, traveling salesman's problem, shortest path, Dijkstra's algorithm.

SEMESTER V **SKILL ENHANCEMENT COURSE** **1 Paper**

Total 100 x 1 = 100 Marks

III. SKILL ENHANCEMENT COURSE SEC 3: (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.*

THEORY OF EQUATIONS **Theory: 30 Lectures**

General properties of polynomials, Graphical representation of a polynomials, maximum and minimum values of a polynomial, General properties of equations, Descarte's rule of signs positive and negative rule, Relation between the roots and the coefficients of equations.

Symmetric functions, Applications of symmetric function of the roots, Transformation of equations. Solutions of reciprocal and binomial equations. Algebraic solutions of the cubic and biquadratic equations.

Properties of the derived functions.

Books Recommended

- W.S. Burnside and A.W. Panton, *The Theory of Equations*, Dublin University Press, 1954.
- C. C. MacDuffee, *Theory of Equations*, John Wiley & Sons Inc., 1954.

SEMESTER VI **SKILL ENHANCEMENT COURSE** **1 Paper**

Total 100 x 1 = 100 Marks

IV. SKILL ENHANCEMENT COURSE SEC 4: (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.*

PROBABILITY AND STATISTICS **Theory: 30 Lectures**

UNIT I

Introduction to random variables (discrete and continuous), cumulative distribution function (c.d.f.), probability mass/density functions, joint p.d.f., joint p.m.f., marginal and conditional distributions, joint c.d.f. and its properties.

Mathematical expectations, moments , moment generating function : limitations and properties, characteristic function.

UNIT II

Discrete distributions: uniform, binomial & Poisson. Continuous distributions: uniform and normal.

Properties of a Random Sample: Basic concepts of Random Sample, convergence in probability, almost sure convergence, convergence in distribution. Order statistics and their distributions.

Books Recommended:

- Robert V. Hogg, Joseph W. McKean and Allen T. Craig, Introduction to Mathematical Statistics, Pearson Education, Asia, 2007.
- Irwin Miller and Marylees Miller, John E. Freund, Mathematical Statistics with Applications, 7th Ed., Pearson Education, Asia, 2006.
- Fundamentals of Mathematical Statistics – S C Gupta & V K Kapoor.

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

Distribution of Credits Semester wise for Undergraduate Honours Courses

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

Semester wise distribution of 140 Credits

	C.C	AECC	GE	SEC	DSE	Total credits
Semester I	12	02	06			20
Semester II	12	02	06			20
Semester III	18		06	02		26
Semester IV	18		06	02		26
Semester V	12				12	24
Semester VI	12				12	24
	84	**04**	**24**	**04**	**24**	**140**

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

Table B-2: UG (B.A./ B.Sc./B.Com. Programme)

Semester wise distribution of 120 Credits

	C.C	AECC	GE	SEC	DSE	Total credits
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
	72	**04**		**08**	**36**	**120**

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

Table B-3: Sample calculation for SGPA for B.Sc./B.A./B.Com Honours Programme

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit X Grade)	SGPA (Credit Point/Credit)
Semester I					
C-1	06	A	8	48	
C-2	06	B+	7	42	
AECC-1	02	B	6	12	
GE-1	06	B	6	36	
Total	**20**			**138**	**6.9 (138/20)**
Semester II					
C-3	06	B	6	36	
C-4	06	C	5	30	
AECC-2	02	B+	7	14	
GE-2	06	A+	9	54	
Total	**20**			**134**	**6.7 (134/20)**
Semester III					
C-5	06	A+	9	54	
C-6	06	0	10	60	
C-7	06	A	8	48	
SEC-1	02	A	8	16	
GE-3	06	0	10	60	
Total	**26**			**238**	**9.15 (238/26)**
Semester IV					
C-8	06	B	6	36	
C-9	06	A+	9	54	
C-10	06	B	6	36	
SEC-2	02	A+	9	18	
GE-4	06	A	8	48	
Total	**26**			**192**	**7.38 (192/26)**
Semester V					
C-11	06	B	6	36	
C-12	06	B+	7	42	
DSE-1	06	0	10	60	
DSE-2	06	A	8	48	
Total	**24**			**186**	**7.75 (186/24)**
Semester VI					
C-13	06	A+	9	54	
C-14	06	A	8	48	
DSE-3	06	B+	7	42	
DSE-4	06	A	8	48	
Total	**24**			**192**	**8.0 (192/24)**
CGPA					
Grand Total	**140**			**1080**	**7.71 (1080/140)**

Table B-4: Sample calculation for CGPA for B.Sc./B.A./B.Com Honours Programme

Semester I	Semester II	Semester III	Semester IV	Semester V	Semester VI
Credit:20; SGPA:6.9	Credit:20; SGPA: 6.7	Credit:26; SGPA: 9.15	Credit:26; SGPA: 7.38	Credit:24; SGPA: 7.75	Credit:24; SGPA: 8.0

Thus CGPA= (20x6.9+20x6.7+26x9.15+26x7.38+24x7.75+24x8.0)/140**=7.71**

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

Table B- 6: 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 Mid Semester Theory Examinations:

Table No. C1: Marks distribution of Theory Examinations of Mid 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
Mid Sem*	T15	15	---	1 Hr	5 x1 =5	2 (out of 3) x5 =10	5	3
	T25	25	---	1 Hr	5 x1 =5	4 (out of 6) x5 =20	5	6

Marks Distribution of End Semester Theory Examinations:

Table No. C2: 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	T60	60	24	3 Hrs	Q.No.1 (10x1) + 1x5 =15	3 (out of 5) x15 =45	2	5
	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. C3: 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 MID SEM EXAMINATION

OF

SUBJECTS WITH PRACTICAL

Ranchi University, Ranchi

Mid Sem No. Exam Year

Subject/ Code

F.M. =15 **Time**=1Hr.

General Instructions:
समान्य निर्देश :

i. **Group A** carries very short answer type compulsory questions.
(खंड 'A' में अत्यंत लघु उत्तरीय अनिवार्य प्रश्न हैं।)
ii. **Answer 2 out of 3** descriptive questions given in **Group B**.
(खंड 'B' के तीन में से किन्हीं दो 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. ..... [5x1=5]
2. .....
3. .....
4. .....
5. .....

Group B

6. ..... [5]
7. ..... [5]
8. ..... [5]

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

FORMAT OF QUESTION PAPER FOR MID SEM EXAMINATION

OF

SUBJECTS WITHOUT PRACTICAL

Ranchi University, Ranchi

Mid Sem No. Exam Year

Subject/ Code

F.M. =25 **Time**=1Hr.

General Instructions:
समान्य निर्देश :

i. **Group A** carries very short answer type compulsory questions.
(खंड 'A' में अत्यंत लघु उत्तरीय अनिवार्य प्रश्न हैं।)
ii. **Answer 4 out of 6** descriptive questions given in **Group B**.
(खंड 'B' के छः में से किन्हीं चार 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. ..... [5x1=5]
2. .....
3. .....
4. .....
5. .....

Group B

6. ..... [5]
7. ..... [5]
8. ..... [5]
9. ..... [5]
10. ..... [5]
11. ..... [5]

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

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** descriptive questions given **in Group B**.
(खंड 'B' के तीन में से किन्हीं दो 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 WITH PRACTICAL

Ranchi University, Ranchi

End Sem No. Exam Year

Subject/ Code

F.M. =60 **P.M.**=30 (Including Mid Sem) **Time**=3Hrs.

General Instructions:

i. **Group A** carries very short answer type **compulsory** questions.
ii. **Answer 3 out of 5** descriptive questions given in **Group B**.
(खंड 'B' के पाँच में से किन्हीं तीन 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. ..... [10x1=10]
ii. .....
iii. .....
iv. .....
v. .....
vi. .....
vii. .....
viii. .....
ix. .....
x. .....

2. ..... [5]

Group B

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

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** descriptive questions given in **Group B**.
(खंड 'B' के छः में से किन्हीं चार 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 & 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** descriptive questions given in **Group B**.
(खंड 'B' के छः में से किन्हीं चार 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.