MODIFIED CBCS CURRICULUM OF

MATHEMATICS HONOURS PROGRAMME

SUBJECT CODE FOR ARTS = 24

SUBJECT CODE FOR SCIENCE = 54

FOR UNDER GRADUATE COURSES UNDER RANCHI UNIVERSITY

Implemented from
Academic Session 2019-2022

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

13/7/18

Head,
Department of Mathematics
Ranchi University, Ranchi

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COURSE STUCTURE FOR UNDERGRADUATE 'HONOURS' PROGRAMME

Table AI-1: Distribution of 164 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	**(CC 1 to 14)**		
Theory	14 Papers	14X4=56	14X5=70
Practical/Tutorial*	14 Papers	14X2=28	14X1=14
II. Elective Course (EC)			
A. Discipline Specific Elective	**(DSE 1 to 4)**		
Theory	4 Papers	4X4=16	4X5=20
Practical/ Tutorial*	4 Papers	4X2=8	4X1=4
B. Generic Elective/ Interdisciplinary	**(GE 1 to 4)**		
Theory	4 Papers	4X4=16	4X5=20
Practical/ Tutorial*	4 papers	4X2=8	4X1=4
III. Ability Enhancement Compulsory Courses (AECC)			
1. English/ Hindi Communication	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)** 2 Papers	2X2=4	2X2=4
		Total Credit = 140 + 24 =164	**140 + 24 = 164**

Note:

In the Academic Council Meeting of Ranchi University, Ranchi, held on 29.06.2019, it is resolved that Students will be offered **Two Generic Elective Subjects** (GE-A & GE-B) in C.B.C.S. U.G. Honours Courses of all streams, so that their 'Eligibility for Admission' in P.G., Vocational & Technical Courses in various Institutions is not hampered.

Table AI-1.1: Course structure for B.Sc./ B.A./ B.Com./B.Voc. (Hons. Programme)

Semester	Honours (Core Courses) 14 Papers	Allied (Elective Courses) 8 Papers	Ability Enhancement (Compulsory Courses) 4 Papers	Total Credits
Sem-I	C-1, C-2 (6+6=12 Credits)	GE-1A, GE-1B (6+6=12 Credits)	English Comm./ Hindi Comm. (02 Credits)	**26 Credits**
Sem-II	C-3, C-4 (6+6=12 Credits)	GE-2A, GE-2B (06 Credits)	EVS (02 Credits)	**26 Credits**
Sem-III	C-5, C-6, C-7 (6+6+6=18 Credits)	GE-3A, GE-3B (06 Credits)	SEC-1 (02 Credits)	**32 Credits**
Sem-IV	C-8, C-9, C-10 (6+6+6=18 Credits)	GE-4A, GE-4B (06 Credits)	SEC-2 (02 Credits)	**32 Credits**
Sem-V	C-11, C-12 (6+6=12 Credits)	DSE-1, DSE-2 (6+6=12 Credits)		**24 Credits**
Sem-VI	C-13, C-14 (6+6=12 Credits)	DSE-3, DSE-4 (6+6=12 Credits)		**24Credits**

Total = 164 Credits

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

Table AI-2 Subject Combinations allowed for B. A. Hons. Programme (164 Credits)

Honours/Core Subject **CC** 14 Papers	Discipline Specific Elective Subject **DSES** 4 Papers	Skill Enhancement Course **SEC** 2 Papers	Compulsory Course **AECC** 1+1=2 Papers
Mathematics Science	Mathematics Specific	SEC in Mathematics	Language Communication + EVS

Table AI-2.1 Semester wise Examination 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	C1	Analytic Geometry 2D, Higher Algebra & Trigonometry +**T**	25	75	---
	C2	Differential Calculus & Vector Calculus +**T**	25	75	---
	GE1A	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	GE1B	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	AECC	Language Communication	---	100	---
II	C3	Analysis I +**T**	25	75	---
	C4	lntegral Calculus & Analytic Geometry 3D +**T**	25	75	---
	GE2A	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	GE2B	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	AECC	EVS	---	100	---
III	C5	Theory of Real Functions +**T**	25	75	---
	C6	Group Theory & Matrices +**T**	25	75	---
	C7	Differential Equations +**T**	25	75	---
	GE3A	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	GE3B	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	SEC 1	Elementary Computer Application Software +**Lab**	---	100	---
IV	C8	Analysis II +**T**	25	75	---
	C9	Mechanics I +**T**	25	75	---
	C10	Ring Theory +**T**	25	75	---
	GE4A	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	GE4B	Refer Table AI-2.3 of the Syllabus of Subject opted	---	100/ (75)	0/ (25)
	SEC 2	Graph Theory + **T**	---	100	---
V	C11	Analysis III {Metric Space & Complex Analysis) +**T**	25	75	---
	C12	Linear Algebra +**T**	25	75	---
	DSE 1	Number Theory +**T**	25	75	---
	DSE 2	Probability and Statistics +**T**	25	75	---
VI	C13	Mechanics II +**T**	25	75	---
	C14	Numerical Analysis +**T**	25	75	---
	DSE 3	Linear Programming +**T**	25	75	---
	DSE 4	Fluid Mechanics +**T**	25	75	---

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Table AI-2.2.1 Generic Subject Papers for B. A. Hons. Programme (164 Credits);
All Four Papers of Any One Subject to be opted leaving aside the papers of Hons. Subject:

Generic Elective Subject GE 4 Papers	Generic Elective Courses for Arts Stream (GE will be other than Core Subject opted			
	Semester I GE1	Semester II GE2	Semester III GE3	Semester IV GE4
Hindi	कला और साहित्य +T	अनुवाद +T	साहित्य और पत्रकारिता +T	रचनात्मक लेखन की विधाएँ +T
English	Academic Writing +T	Language & Linguistics +T	Literature: Poems & Short Stories +T	Language, Literature & Culture +T
Bengali	History of Bengali Literature +T	Bengali Poetry, Novel, Short Stories +T	Bengali Poetry, Drama, Short Stories +T	Bengali Poetry, Short Stories, Bengali Essay +T
Urdu	Study of Poet Nazir Akbarabadi +T	Study of Short Story Writer Prem Chand +T	Mass Media: Principles and Practice +T	Study of Short Story Writer +T
Sanskrit	संस्कृत व्याकरण एवं व्याकरण शास्त्र का इतिहास +T	भारतीय संस्कृति एवं राजनीति +T	आयुर्वेद की परम्परा +T	भाषाविज्ञान +T
Ho	कला, साहित्य एवं संस्कृति +T	पारम्परिक वाद्य यंत्र +T	झारखण्डी समुदाय का सांस्कृतिक केन्द्र +T	हो समुदाय की नृत्य शैलियाँ +T
Kharia	कला, साहित्य एवं संस्कृति +T	पारम्परिक वाद्य यंत्र +T	झारखण्डी समुदाय का सांस्कृतिक केन्द्र +T	खड़िया समुदाय की नृत्य शैलियाँ +T
Khortha	कला, साहित्य एवं संस्कृति +T	पारम्परिक वाद्य यंत्र +T	झारखण्डी समुदाय का सांस्कृतिक केन्द्र +T	खोरठा समुदाय की नृत्य शैलियाँ +T
Kurmali	कला, साहित्य एवं संस्कृति +T	पारम्परिक वाद्य यंत्र +T	झारखण्डी समुदाय का सांस्कृतिक केन्द्र +T	कुरमाली समुदाय की नृत्य शैलियाँ +T
Kurux	कला, साहित्य एवं संस्कृति +T	पारम्परिक वाद्य यंत्र +T	झारखण्डी समुदाय का सांस्कृतिक केन्द्र +T	कुँड़ुख समुदाय की नृत्य शैलियाँ +T
Mundari	कला, साहित्य एवं संस्कृति +T	पारम्परिक वाद्य यंत्र +T	झारखण्डी समुदाय का सांस्कृतिक केन्द्र +T	मुण्डा समुदाय की नृत्य शैलियाँ +T
Nagpuri	कला, साहित्य एवं संस्कृति +T	पारम्परिक वाद्य यंत्र +T	झारखण्डी समुदाय का सांस्कृतिक केन्द्र +T	नागपुरी समुदाय की नृत्य शैलियाँ +T
Panch Pargania	कला, साहित्य एवं संस्कृति +T	पारम्परिक वाद्य यंत्र +T	झारखण्डी समुदाय का सांस्कृतिक केन्द्र +T	पंचपरगनिया समुदाय की नृत्य शैलियाँ +T
Santhali	कला, साहित्य एवं संस्कृति +T	पारम्परिक वाद्य यंत्र +T	झारखण्डी समुदाय का सांस्कृतिक केन्द्र +T	संताल समुदाय की नृत्य शैलियाँ +T
Geography	Geomorphology +Lab	Human Geography +Lab	Climatology +Lab	Economic Geography +Lab
History	Environmental Issues in India +T	Making of Contemporary India +T	History of West Asia +T	India and her Neighbours +T
Political Science	An Introduction to Political Theory +T	Indian Govt. and Politics +T	Comparative Govt. and Politics +T	Public Administration +T
Psychology	Introduction of psychology +Lab	Social psychology +Lab	Psychopathology +Lab	Psychological Statistics +Lab
Sociology	Indian Society and Culture +T	Social Movement in India +T	Sociology of Religion +T	Indian Sociological Theories +T
Economics	Principals of Microeconomics +T	Principals of Macroeconomics +T	Indian Economy +T	Money Banking & Public Finance +T
Anthropology	Economic Anthropology +T	Political Anthropology +T	Anthropology of Religion +T	Linguistic Anthropology +T
Philosophy	Indian Philosophy-I +T	Indian Philosophy-II +T	Indian Ethics +T	Western Ethics +T
Home Science	Human Nutrition +Lab	Entrepreneurship for small Catering units +Lab	Current concerns in Public Health Nutrition +T	Care and Wellbeing in Human Development +Lab

Table AI-2.2.2 Generic Subject Papers for B. Sc. Hons. Programme (164 Credits);

<u>All Four Papers of Any One Subject</u> to be opted leaving aside the papers of Hons. Subject:

Generic Elective Subject **GE** **4 Papers**	Generic Elective Courses for Arts Stream (GE will be other than Core Subject opted			
	Semester I **GE1**	Semester II **GE2**	Semester III **GE3**	Semester IV **GE4**
Physics	Mechanics +**Lab**	Electricity and Magnetism +**Lab**	Thermal & Statistical Physics +**Lab**	Waves and Optics +**Lab**
Chemistry	Atomic Structure, Bonding, General Org Chem & Aliphatic Hydrocarbons +**Lab**	Chemical Energetics, Equilibria & Functional Gp Org Chemistry-I +**Lab**	Chem. of s- and p-block elements, States of matter and Chem. Kinetics +**Lab**	Chem. of d-block elements, Molecules of Life +**Lab**
Geology	Essentials of Geology +**Lab**	Rocks & Minerals +**Lab**	Fossils & their Applications +**Lab**	Earth Resources +**Lab**

Table AI-2.3 Semester wise Structure for End Sem Examinations of Generic Elective in Mathematics:

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	GE1	Differential Calculus And Coordinate Geometry 2D +**T**	---	100	---
II	GE2	Integral Calculus, Vector Calculus & Trigonometry +**T**	---	100	---
III	GE3	Real Analysis-I, Group Theory & Differential Equations +**T**	---	100	---
IV	GE4	Real Anaysis-II, Complex Variable, Set Theory & Matrices +**T**	---	100	---

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SEMESTER I   5 Papers

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Total 100 x 5 = 500 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)

II.   GENERIC ELECTIVE (GE 1A):

(Credits: 06)

All Four Papers (Refer Table AI 2.2) of any One Subject to be opted other than the Honours Subject. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

III.   GENERIC ELECTIVE (GE 1B):

(Credits: 06)

All Four Papers (Refer Table AI 2.2) of any One Subject to be opted other than the GE1 & Honours Subject. Refer Table AI 2.4 and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

IV. <u>CORE COURSE –C 1:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for
<u>Mid Semester Examination (MSE):</u>
*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

<u>End Semester Examination (ESE):</u>
*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.

ANALYTIC GEOMETRY 2D, HIGHER ALGEBRA & TRIGONOMETRY
Theory: 75 Lectures; Tutorial:15 Lectures

UNIT I - ANALYTICAL GEOMETRY OF 2D
Change of rectangular axes. Condition for the general equation of second degree to represent parabola, ellipse, hyperbola and reduction into standard forms. Equations of tangent and normal (Using Calculus). Chord of contact, Pole and Polar. Pair of tangents in reference to general equation of conic. Axes, centre, director circle in reference to general equation of conic. Polar equation of conic.

UNIT II - HIGHER ALGEBRA & TRIGONOMETRY
Statement and proof of binomial theorem for any index, exponential and logarithmic series.
De Moivre's theorem and its applications.
Trigonometric and Exponential functions of complex argument and hyperbolic functions.
Summation of Trigonometrical series.
Factorisation of $\sin\theta$, $\cos\theta$.

Books Recommended:
- Analytical Geometry & Vector Analysis – B. K. Kar, Books & Allied Co., Kolkata
- Analytical Geometry of two dimension – Askwith
- Coordinate Geometry – S L Loney.
- Trigonometry – Das and Mukherjee
- Trigonometry - Dasgupta

V.   <u>CORE COURSE- C 2:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

<u>*End Semester Examination (ESE):*</u>

*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.

DIFFERENTIAL CALCULUS & VECTOR CALCULUS
Theory: 75 Lectures; Tutorial:15 Lectures

UNIT I - DIFFERENTIAL CALCULUS
Successive differentiation, Leibnitz's theorem. Maclaurin and Taylor series expansion.
Partial differentiation, Euler's theorem for functions of two variables, Total differential, Jacobian.

Tangent and normal, curvature. Asymptotes. Maxima and Minima of functions of two variables, Lagrange's multipliers.

UNIT II - VECTOR CALCULUS
Product of three and four vectors, work done, moment of a vector about a point and a line.
Scalar and vector point functions, differentiation of a vector function of scalar variables. Gradient, Divergence and Curl, second order operators in Cartesian coordinate system.

Suggested Readings
- Calculus – G B Thomas & R L Finney.
- Differential Calculus – Das & Mukherjee.
- Vector Calculus – Dasgupta.
- Vector Calculus – Shanti Narayan

SEMESTER II   **5 Papers**

Total 100 x 5 = 500 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 :

  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.

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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.
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- Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
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- 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.
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- Sengupta, R. 2003. *Ecology and economics*: An approach to sustainable development. OUP.
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- 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

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II.   **GENERIC ELECTIVE (GE 2A):**   (Credits: 06)
GE2A paper of First subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

III.   **GENERIC ELECTIVE (GE 2B):**   (Credits: 06)
GE2B paper of Second subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

IV.   <u>CORE COURSE -C 3:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

<u>*End Semester Examination (ESE):*</u>

*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.*

ANALYSIS - I   **Theory: 75 Lectures; Tutorial:15 Lectures**

UNIT I – ANALYSIS - I

The axiom of least upper bound and greatest lower bound in *R*. The completeness property of *R*, Archimedean property, density of rational and irrational numbers in R. Neighbourhoods and limit point of a set, open and closed sets, isolated points, Bolzano – Weierstrass theorem for sets (Statement only).

Sequences, bounded sequence, convergent sequence, monotonic sequence, subsequence, Cauchy sequence and Cauchy's general principle of convergence.

Infinite series, Convergence and divergence of infinite series of real numbers, Pringsheim's theorem, Comparison test, Cauchy's root test, D'Alembert's ratio test, Raabe's test, De-Morgan's and Bertrand's test, Gauss's ratio test, Cauchy's condensation test, Integral test, Alternating Series, Leibnitz test, Absolute and conditional convergence.

Books Recommended:

☐ Elements of Real Analysis – Shanti Narayan & M D Raisinghania.
☐ Higher Algebra – S Bernard & J M Child

V.   <u>CORE COURSE -C 4:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

<u>*End Semester Examination (ESE):*</u>

*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.

LNTEGRAL CALCULUS & ANALYTIC GEOMETRY 3D
Theory: 75 Lectures; Tutorial:15 Lectures

UNIT I – INTEGRAL CALCULUS
Integration of rational and irrational functions.
Evaluation of definite integrals, Special integrals, differentiation and integration under the sign of integration (Beta and Gamma functions are excluded), reduction formulae.

Point of inflexion, double point, curve tracing. Length of plane curve and area bounded by plane curves. Volume and surface area of solid of revolution.

UNIT II – ANALYTICAL GEOMETRY 3D
Rectangular, spherical-polar and cylindrical co-ordinates, direction cosines.

Angle between straight lines, equation of planes and straight lines, shortest distance between the lines.

Sphere.

Suggested Readings
- Calculus – G B Thomas & R L Finney.
- Integral Calculus – Das & Mukherjee.
- Integral Calculus – Lalji Prasad.
- Coordinate Geometry of 3D – J T Bell
- Analytical Geometry of 3D – Lalji Prasad.

SEMESTER III   **6 Papers**

Total 100 x 6 = 600 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)

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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. <u>MS-WORD LAB ASSIGNMENT</u>

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

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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.
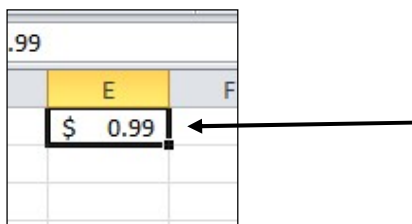
11. Calculate Total Cost (column F) as *column D times Column E*. You will type in a formula like this into cell F2: **=D2*E2** (Be sure to begin the formula with an equal sign)
12. Use the AutoFill (skinny plus sign) again to copy the formula down column F; down to F10. Double check the picture below 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 $\sum$ 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

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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)

II. <u>GENERIC ELECTIVE (GE 3A):</u>   (Credits: 06)

GE3A paper of First subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

III. <u>GENERIC ELECTIVE (GE 3B):</u>   (Credits: 06)

GE3B paper of Second subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

IV. <u>CORE COURSE -C 5:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

<u>*End Semester Examination (ESE):*</u>

*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.

THEORY OF REAL FUNCTIONS   **Theory: 75 Lectures; Tutorial:15 Lectures**

UNIT I
Limit of functions: Limit, algebra of limit of functions. Continuity and discontinuities, algebra of continuous functions. Intermediate value theorem, location of roots theorem, preservation of intervals theorem. Uniform continuity, functions of bounded variations.

Derivability: Derivability, relationship with continuity, Rolle's theorem, Lagrange's and Cauchy Mean value theorem, Taylor's theorem, Maclaurin's theorem, remainder after n terms, power series

expansion of $(1+x)^n, \sin x, \cos x, e^x, \log x$ using suitable remainder after n terms.

UNIT II
Riemann Integration: Definition, Darboux theorem I and II, integrability conditions. Particular classes of bounded integrable functions. Primitive, Fundamental theorem, First and Second Mean value theorem.

Books Recommended:
☐ Introduction to Real Analysis- R Bartle & D R Sherbert
☐ Elements of Real Analysis- Shanti Narayan & M D Raisinghania.

V.   <u>CORE COURSE -C 6:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

<u>*End Semester Examination (ESE):*</u>

*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.

GROUP THEORY & MATRICES   Theory: 75 Lectures; Tutorial:15 Lectures

UNIT I - GROUP THEORY
Groups: Preliminary results, equivalent definitions, sub groups, Cyclic Group and its subgroups, Cosets of a subgroups, Lagrange's Theorem and it's applications.

Normal subgroups, Quotient group and homomorphism, Fundamental theorem of homomorphism.

Permutations, Permutation group, Symmetric and Alternating group. Caylay's Theorem.

UNIT II - MATRICES
Different types of Matrices, Algebra of Matrices, Adjoint and inverse of a Matrix, different ways of finding inverses.

Elementary row and column operations. Elementary matrices, equivalent matrices, Rank of a matrix, Invariance of rank through elementary row/column operations, rank of sum and product of matrices and related theorems.
Solution of a system of linear equations via matrix methods, Consistency, Inconsistency.

Books Recommended:

- ☐ John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.
- ☐ Joseph A. Gallian, Contemporary Abstract Algebra, 4th Ed., Narosa Publishing House, New Delhi, 1999.
- ☐ Topics in Algebra : I N Herstein .
- ☐ Basic Abstract Algebra: P B Bhattacharya, Cambridge Univ. Press.
- ☐ Matrices – Shanti Narayan.
- ☐ Matrices – A R Vashishtha.

VI. <u>CORE COURSE -C 7:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	**Pass Marks (MSE + ESE) =40**

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

<u>*End Semester Examination (ESE):*</u>

*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.

DIFFERENTIAL EQUATIONS   **Theory: 75 Lectures; Tutorial:15 Lectures**

UNIT I
Differential equation of first order but not of first degree, Clairaut's form, singular solutions.
Differential equation with constant co-efficients.
Orthogonal trajectories and its simple application in geometrical and mechanical problems.

Linear differential equations of higher order with constant coefficients. Differential equations with variable coefficients.

UNIT II
Linear differential equations of second order by method of variation of parameter and by change of independent variable.
Total differential equation in three independent variables.
Partial differential equation: Lagrange's linear partial differential equation, Charpit's method.

Books Recommended:
1. Differential Equations – M D Raisinghania.

SEMESTER IV   **6 Papers**

Total 100 x 6 = 600 Marks

I.   <u>SKILL ENHANCEMENT COURSE SEC 2:</u>   (Credits: Theory-02)

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

Instruction to Question Setter for

<u>*End Semester Examination (ESE):*</u>

*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: 75 Lectures; Tutorial:15 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.

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II.   <u>GENERIC ELECTIVE (GE 4A):</u>   (Credits: 06)
GE4A paper of First subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

III.   <u>GENERIC ELECTIVE (GE 4B):</u>   (Credits: 06)
GE4B paper of Second subject selected in Sem-I to be studied. Refer Table AI 2.4 for name of papers and for Content in detail refer the Syllabus of Opted Generic Elective Subject.

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IV.   CORE COURSE -C 8:   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

<u>*End Semester Examination (ESE):*</u>

*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.

ANALYSIS - II   **Theory: 75 Lectures; Tutorial:15 Lectures**

UNIT I
Convergence of improper integrals, comparison tests, absolute convergence, Abel's and Dirichlet's tests.

Frullani's Integrals. Definition & convergence of Beta & Gamma functions and their properties, duplication formula, inter-relation.

Evaluation of double and triple integrals. Multiple Integrals of Dirichlet's form, Liouville's extension.

Change of order of integration and change of variables.

UNIT II
Vector integration: Line integral, surface integral, volume integral, Green's theorem in R^2, Stoke's theorem, Gauss Divergence theorem.

Books Recommended:
☐   Higher Engineering Mathematics – B S Grewal
☐   Elements of Real Analysis – Shanti Narayan & M D Raisinghania.
☐   Mathematical Analysis – J N Sharma & A R Vashishtha.

V.   <u>CORE COURSE -C 9:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

<u>*End Semester Examination (ESE):*</u>

*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 - I   Theory: 75 Lectures; Tutorial:15 Lectures

UNIT I - STATICS
Reduction of system of coplanar forces, equation of resultant, condition for equilibrium. Astatic centre.
Laws, angles and cone of friction, equilibrium on a rough inclined plane, particle constrained to move on a rough curve under any given forces.

UNIT II - DYNAMICS
Kinematics in two dimension: Tangential, normal, radial, transverse velocities and acceleration. Angular velocity and acceleration. Rectilinear motion and simple pendulum. S.H.M., compounding of two S.H.M. Repulsive motion. Motion under inverse square law.

Rectilinear Motion (Kinetics): Newton's law, Work, K.E., work energy principle, Impulse, Torque and angular momentum, conservation of energy, momentum and angular momentum, Hooke's law, extension of an elastic string: Horizontal & vertical case.

Books Recommended:
  ☐ Statics – S L Loney
  ☐ Dynamics – S L Loney
  ☐ Mechanics – Singh & Sen, Bharti Bhawan Publications.

VI.   <u>CORE COURSE -C 10:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.

<u>*End Semester Examination (ESE):*</u>

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.

RING THEORY   **Theory: 75 Lectures; Tutorial:15 Lectures**

UNIT I

Ring: Definition and examples, commutative ring, ring with unity, unit in a ring, Matrix ring, Boolean ring, Ring of continuous functions. Direct product of rings, Properties of rings, subrings.

Nilpotent element, idempotent element, zero divisors, integral domain, division ring and field. Characteristic of a ring.

Ideal, ideal generated by a subset of a ring, simple ring, factor rings, operations on ideals, prime and maximal ideals.

Ring homomorphisms, properties of ring homomorphisms, Isomorphism theorems I, II and III, field of quotients.

UNIT II

Polynomial rings over commutative rings, division algorithm and consequences, principal ideal domains, factorization of polynomials, reducibility tests, irreducibility tests, Eisenstein's criterion.

Books Recommended:

- John B. Fraleigh, *A First Course in Abstract Algebra*, 7th Ed., Pearson, 2002**.**
- Joseph A. Gallian, *Contemporary Abstract Algebra,* 4th Ed., Narosa Publishing House, New Delhi, 1999.
- C Musili, *Introduction to Rings and Modules,* 2nd edition, Narosa Publishing House.
- Modern Algebra – surjeet singh & Qazi Zamiruddin

SEMESTER V   4 Papers

Total 100 x 4 = 400 Marks

I.   <u>MATHEMATICS SPECIFIC (DSE 1):</u>

(Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

<u>*End Semester Examination (ESE):*</u>

*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.*

NUMBER THEORY   **Theory: 75 Lectures; Tutorial:15 Lectures**

UNIT I

Divisibility and primes, H.C.F., Euclid's Algorithm, unique factorization, perfect numbers.

Residue class, complete and reduced residue system, congruences and their properties, Fermat's theorem, Wilson's theorem.

Arithmetical functions, Euler's and Mobius function, Mobius inversion formula.

Algebraic Congruence, solution by inspection, Solution of $ax \equiv b(\mod c)$, system of linear congruences, Chinese remainder theorem.

UNIT II

The Diophantine equations : $ax + by = c$, $x^2 + y^2 = z^2$.

Farey sequence, continued fractions, Pell's equation.

Books Recommended:
- Number Theory – G H Hardy & E M Wright.
- Number Theory – S G telang.
- Number Theory - Harikisan

II.   **MATHEMATICS SPECIFIC (DSE 2):**   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.

<u>*End Semester Examination (ESE):*</u>

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.

PROBABILITY AND STATISTICS   **Theory: 75 Lectures; Tutorial:15 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.

III.   <u>CORE COURSE -C 11:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.

<u>*End Semester Examination (ESE):*</u>

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.

ANALYSIS III (METRIC SPACE & COMPLEX ANALYSIS)
Theory: 75 Lectures; Tutorial:15 Lectures

UNIT I – METRIC SPACE

Metric spaces: Definition and examples of metric spaces. Sequences in metric space, Cauchy sequence, complete metric space.

 Open and closed balls, neighbourhood, open set, interior of a set. Limit point of a set, closed set.

Diameter of a set, Cantor's theorem. Subspaces, dense sets, perfect sets. Baire's Category theorem.

Continuous mappings, sequential criterion and characterizations of continuity by open sets, Homeomorphism.

UNIT II – COMPLEX ANALYSIS

Complex Analysis: Complex numbers, Continuity and differentiability of functions of complex variable, Analytic functions, Cauchy- Riemann differential equations in Cartesian and polar forms

Conformal representation: Transformation, Jacobian, conformal transformation, some general transformations, bilinear transformation. critical points, fixed points, cross ratio, preservance of cross ratio, fixed points of bilinear transformation.

Books Recommended:

- ☐ Introduction to Topology – G F Simmons.
- ☐ Metric Spaces – P K Jain & Khalil Ahmad.
- ☐ Complex variable – J N Sharma.

IV. <u>CORE COURSE -C 12:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.

<u>*End Semester Examination (ESE):*</u>

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.

LINEAR ALGEBRA   **Theory: 75 Lectures; Tutorial:15 Lectures**

UNIT I

Vector spaces, subspaces, algebra of subspaces, linear combination of vectors, linear span, linear dependence and linear independence, basis and dimension, co-ordinate vector of a vector relative to a basis. Complement of a subspace, direct sum and quotient space.

Linear transformations, null space, range, rank and nullity of a linear transformation, Sylvester's law of nullity. Matrix representation of a linear transformation, algebra of linear transformations. Isomorphism, isomorphism theorems, invertibility and isomorphism, change of coordinate matrix.

UNIT II

Linear functional, dual spaces, dual basis, double dual, transpose of a linear transformation and its matrix in the dual basis. Characteristic polynomial and characteristic values of a linear operator, diagonalizability, Cayley-Hamilton theorem and its applications.

Books Recommended:

☐ Linear Algebra – K Hoffman & R Kunze.
☐ Higher Algebra – S K Mapa.
☐ Linear Algebra – A R Vashishtha.

SEMESTER VI   **4 Papers**

Total 100 x 4 = 400 Marks

I.   MATHEMATICS SPECIFIC (DSE 3):   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	**Pass Marks (MSE + ESE) =40**

Instruction to Question Setter for

Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

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.

LINEAR PROGRAMMING   **Theory: 75 Lectures; Tutorial:15 Lectures**

UNIT I

Convex sets and their properties, Introduction to linear programming problem, solution by graphical method, simplex method, optimality and unboundednes, artificial variables, two-phase method, Big-M method. Duality, formulation of the dual problem, primal-dual relationships, economic interpretation of the dual.

UNIT II

Transportation problem and its mathematical formulation, northwest-corner method, least cost method and Vogel approximation method for determination of starting basic solution, algorithm for solving transportation problem.

Assignment problem and its mathematical formulation, Hungarian method for solving assignment problem.

Books Recommended:
- ☐ Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, *Linear Programming and Network Flows,* 2nd Ed., John Wiley and Sons, India, 2004.
- ☐ F.S. Hillier and G.J. Lieberman, *Introduction to Operations Research,* 9th Ed., Tata McGraw Hill, Singapore, 2009.
- ☐ Hamdy A. Taha, *Operations Research, An Introduction,* 8th Ed., Prentice-Hall India, 2006.
- ☐ G. Hadley, *Linear Programming*, Narosa Publishing House, New Delhi, 2002.
- ☐ Operations Research – S D Sharma.
- ☐ Linear Programming Problems – R K Gupta.

II.   **MATHEMATICS SPECIFIC (DSE 4):**   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

*End Semester Examination (ESE): 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.

FLUID MECHANICS - I   **Theory: 75 Lectures; Tutorial:15 Lectures**

UNIT I- HYDROSTATICS

Nature and properties of fluid pressure, pressure of heavy liquids.

Equilibrium of fluids under given system of forces.

Centre of pressure.

Thrust on plane and curved surfaces.

UNIT II - HYDRODYNAMICS

Fluid Motion: Lagrangian and Eulerian methods. Equation of continuity in different forms. Euler's equation of motion for perfect fluid. Bernoulli's theorem.

Books Recommended:

- ☐ Hydrostatics – M Rahman
- ☐ Hydrostatics – J P Sinha
- ☐ Hydrodynamics – Shanti Swaroop
- ☐ Hydrodynamics – M D Raisinghania

III.   <u>CORE COURSE -C 13:</u>   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

<u>*Mid Semester Examination (MSE):*</u>

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

<u>*End Semester Examination (ESE):*</u>

*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 - II   **Theory: 75 Lectures; Tutorial:15 Lectures**

UNIT I - STATICS

Condition of equilibrium of forces in three dimension. Central axis, Wrench, Pitch, Null lines.

Principle of virtual work and its application in two dimensional cases.

Common Catenary

Stable equilibrium, energy test of stability (problems involving one variable only).

UNIT II - DYNAMICS

Motion of a particle under a central force, differential equations of central orbit in both polar and pedal co-ordinates.

Newton's law of gravitation, planetary orbits, Keplar's laws of motion.

Motion of a projectile under gravity in a non-resisting medium.

Motion of mass centre and motion relative to mass centre, D' Alembert's principle. Two dimensional motion of a rigid body, compound pendulum.

Books Recommended:

- ☐ Statics – S L Loney.
- ☐ Statics – Goyal & Gupta
- ☐ Dynamics – S L Loney.
- ☐ Dynamics – R K Gupta & D C Agarwal.

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IV.   CORE COURSE -C 14:   (Credits: Theory-05, Tutorial-01)

Marks : 25 (MSE: 1Hr) + 75 (ESE: 3Hrs)=100	Pass Marks (MSE + ESE) =40

Instruction to Question Setter for

Mid Semester Examination (MSE):

*There will be **two** group of questions. **Group A is compulsory** and will contain five questions of **very short answer type** consisting of 1 mark each. **Group B will contain descriptive type** six questions of five marks each, out of which any four are to answer.*

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.

NUMERICAL ANALYSIS   **Theory: 75 Lectures; Tutorial:15 Lectures**

UNIT I

Solution of algebraic and transcendental equations: Bisection method, Regula-Falsi method, Newton-Raphson method.
Solution of simultaneous equations: Gauss's elimination method, Matrix inversion by triangularization method.
Calculus of finite difference: The operators Δ, ∇, E, factorial notation, their properties and inter-relation between them, Fundamental theorem of difference calculus, divided differences.
Interpolation: Newton's forward and backward difference interpolation formula, Lagrange's interpolation formula, central difference interpolation, Gauss's forward, backward and central difference interpolation formula.

UNIT II

Numerical differentiation: Derivative using forward, backward and central difference interpolation formulae.
Numerical integration: General quadrature formula, Simpson's one-third and three -eighth rule, Weddle's rule, Newton-Cote's method.
Solution of ordinary differential equations: Picard's method of successive approximations.

NB : USE OF SCIENTIFIC CALCULATOR ALLOWED.

Books Recommended:

- ☐ Numerical Analysis – J B Scarborough.
- ☐ Numerical Methods – B S Grewal.
- ☐ Numerical Analysis – G Shankar Rao, New Age Int. Publishers.
- ☐ Numerical Analysis – G S Mallik

Session 2019-22 onwards

COURSES OF STUDY FOR **GENERIC ELECTIVE 'B. A. Hons'** PROGRAMME IN
"MATHEMATICS"

SEMESTER I   **GENERIC ELECTIVE**   **1 Paper**

Total 100 x 1 = 100 Marks

I.   GENERIC ELECTIVE (GE 1)   (Credits: Theory-05, Tutorial-01)

➢ All Four Generic Papers (One paper to be studied in each semester) of History to be studied by the Students of **Other than Mathematics Honours.**
➢ Students of **Mathematics Honours** must Refer Content from the **Syllabus of Opted Generic Elective Subject**.

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.

Suggested Readings:
☐ Differential Calculus: A Das Gupta & S B Prasad.
☐ Differential Calculus: Lalji Prasad
☐ Coordinate Geometry: A Das Gupta
☐ Coordinate Geometry: Lalji Prasad

SEMESTER II   **GENERIC ELECTIVE**   **1 Paper**

Total 100 x 1 = 100 Marks

II.   GENERIC ELECTIVE (GE 2)   (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, Partial Fractions, Integration by Transformation, 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 Vector Calculus and Vector Point Functions, Vector Function of Scalar Variables, Continuity of a vector function. Differentiation of a vector with respect to the scalar variable. 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 Prajasad
- Trigonometry: DAsgupta & Prasad
- Trigonometry: Lalji prasad.

SEMESTER III   **GENERIC ELECTIVE**   **1 Paper**

Total 100 x 1 = 100 Marks

III. __GENERIC ELECTIVE (GE 3)__

(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

Sequence: Definition, Bounds, Limit of a sequence, Monotonic Sequence and their convergence, Algebraic Operations and Limit, Cauchy Sequence, General Principle of Convergence of a sequence. Series: Definitions, 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

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.

UNIT III- DIFFERNTIAL EQUATIONS

Differential Equations of First Order and Higher Degree, Clairaut's Form, Singular Solution, Orthogonal Trajectories.
Linear Equation with Constant Co-efficient, Homogenous Linear Equation with variable coefficients.

Simultaneous equations $\dfrac{dx}{P} = \dfrac{dy}{Q} = \dfrac{dz}{R}$, and Total Differential Equations $Pdx + Qdy + Rdz = 0$

together with Geometric Significance.

Books Recommended:
☐ Real Analysis: Shanti Naryan & M D Raisinghania.
☐ Real Analysis: Lalji Prasad
☐ Abstract algebra: A R Vashishtha
☐ Modern Algebra: Lalji Prasad
☐ Differential Equations: MD Raisinghania

Session 2019-22 onwards

SEMESTER IV   **GENERIC ELECTIVE**   **1 Paper**

Total 100 x 1 = 100 Marks

II.   GENERIC ELECTIVE (GE 4)

(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 ANAYSIS-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

COURSES OF STUDY FOR **ABILITY ENHANCEMENT COMPULSORY COURSE** IN **"MATHEMATICS"**

SEMESTER I   **ENGLISH COMMUNICATION**   **1 Paper**

I.   ENGLISH COMMUNICATION   Theory: 30 Lectures

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.

OBJECTIVE: To equip students effectively to acquire skills in reading, writing, comprehension and communication, as also to use electronic media for English Communication.

Unit I: Communication – Definition, stages, barriers, types: verbal and non-verbal, Listening- Meaning, Nature and importance, Principles of Good Listening.

Unit II: Class-presentation (Oral for five minutes) on any of the above-mentioned topics: Descriptive writing, expansion of an idea.

Unit III: Writing skills –, notice writing, advertisement writing, précis writing, essay writing, letter writing (applications), Business letter formats (letters of enquiry, replies and complaints), resume writing, covering letter

Unit IV: Vocabulary building: One word substitution, synonyms and antonyms, idioms and phrases

Suggested Reading:

- *Technical Communication*, M.H. Rizvi, Tata McGrawhill
- *Effective Business Communication*, Asha Kaul
- *Developing Communication Skills*, Krishnamohan
- *Functional Grammar and Spoken and Written Communication in English*, Bikram K. Das, Orient Blackswan
- *Precis, Paraphrase and Summary,*P.N. Gopalkrishnan, Authors Press
- *Communication Skills,* Sanjay Kumar and Pushplata, Oxford Publication

Note: Latest edition of text books may be used.

OR

SEMESTER I   **HINDI COMMUNICATION**   **1 Paper**

Total 100 x 1 = 100 Marks

II.   HINDI COMMUNICATION   **Theory: 30 Lectures**

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

प्रश्न पत्र के लिए निर्देश
<u>छमाही परीक्षा :</u>

प्रश्नों के दो समूह होंगे। खण्ड 'A' अनिवार्य है जिसमें तीन प्रश्न होंगे। प्रश्न संख्या 1 में दस अत्यंत लघु उत्तरीय 1 अंक के प्रश्न होंगे। प्रश्न संख्या 2 व 3 लघु उत्तरीय 5 अंक का प्रश्न होगा। खण्ड 'B' में छः में से किन्हीं चार 20 अंको के वर्णनात्मक प्रश्नों के उत्तर देने होंगे।
नोट : थ्योरी परीक्षा में पूछे गए प्रत्येक प्रश्न में उप–विभाजन हो सकते हैं।

हिन्दी व्याकरण एवं संप्रेषण

(क्रेडिट: सैद्धान्तिक -02)

सैद्धान्तिक: 30 व्याख्यान

इकाई–1   **हिन्दी व्याकरण और रचना,**

संज्ञा, सर्वनाम, विशेषण, क्रिया, अव्यय, कारक, वचन, संधि,उपसर्ग, प्रत्यय तथा समास, लिंग निर्णय, पर्यायवाची शब्द, विलोम शब्द, अनेक शब्दों के लिए एक शब्द, शब्द शुद्धि, वाक्य शुद्धि, मुहावरे और लोकोक्तियां, पल्लवन एवं संक्षेपण।

इकाई –2   **निबंध कला तथा समसामयिक एवं राष्ट्रीय विषयों पर निबंध लेखन**

इकाई –3   **संप्रेषण (संचार)**

—संप्रेषण की अवधारणा और महत्व, संप्रेषण के लिए आवश्यक शर्तें, संप्रेषण के प्रकार, संप्रेषण का माध्यम, संप्रेषण कला, संप्रेषण की तकनीक, वाचन कला, समाचार वाचन, साक्षात्कार कला, रचनात्मक लेखन का लक्ष्य, रचनात्मक लेखन का आधार, भाव और विचारों की प्रस्तुति, वाक् कला की उपयोगिता।

अनुशंसित पुस्तकें :–

- वृहत व्याकरण भास्कर   : डॉ0 वचनदेव कुमार
- वृहत निबंध भास्कर   : डॉ0 वचनदेव कुमार
- आधुनिक हिन्दी व्याकरण और रचना   : डॉ0 वासुदेव नन्दन प्रसाद
- रचना मानस   : प्रो0 रामेश्वर नाथ तिवारी
- व्यवहारिक हिन्दी   : डॉ0 जंग बहादुर पाण्डेय
- रचनात्मक लेखन   : डॉ0 रमेश गौतम
- राजहंस हिन्दी निबंध   : प्रो0 आर0 एन0 गौड़
- सफल हिन्दी निबंध   : रत्नेश्वर
- निबंध सहचर   : डॉ0 लक्ष्मण प्रसाद
- उपकार मुहावरे और लोकोक्तियाँ   : प्रो0 राजेश्वर प्रसाद चतुर्वेदी
- कहानियों कहावतों की   : प्रताप अनम
- सम्प्रेषणपरक हिन्दी भाषा शिक्षण   : डॉ0 वैश्ना नारंग
- शैली विज्ञान   : डॉ0 सुरेश कुमार
- शैली विज्ञान प्रतिमान और विश्लेषण : डॉ0 पांडेय शशिभूषण 'शीतांशु'
- शैली विज्ञान का इतिहास   : डॉ0 पांडेय शशिभूषण 'शीतांशु'

OR

SEMESTER I　　　　　　**AECC NH + ENGLISH**　　　　　　**1 Paper**

Total 50 x 2 = 100 Marks

III.　AECC NH + MB   COMMUNICATION
　　(NON-HINDI + MATRI BHASHA)
　　अहिन्दी + मातृभषा　　　　　　　　(क्रेडिट: सैद्धान्तिक 01 + 01 = 02)

[A]　NON-HINDI　　　　　　　　　　　**Theory: 15 Lectures**
　　अहिन्दी　　　　　　　　　　　　(क्रेडिट: सैद्धान्तिक -01)

Marks : 50 (ESE 1.5 Hrs) = 50	Pass Marks Th ESE = 20

प्रश्न पत्र के लिए निर्देश
छमाही परीक्षा :

प्रश्नों के दो समूह होंगे। खण्ड 'A' अनिवार्य है जिसमें लघु उत्तरीय 5 अंक का दो प्रश्न होगा। खण्ड B' में तीन में से किन्हीं दो 20 अंको के वि?यिन?ठ/ वर्णनात्मक प्रश्नों के उत्तर देने होंगे।

नोट : सैद्धान्तिक परीक्षा में पूछे गए प्रत्येक प्रश्न में उप–विभाजन हो सकते हैं।

हिन्दी व्याकरण एवं संप्रेषण　　　　　　सैद्धान्तिक: 15 व्याख्यान

इकाई–1　हिन्दी व्याकरण और रचना,
　　संज्ञा, सर्वनाम, वि?ोशण, क्रिया, अव्यय, कारक, वचन, संधि,उपसर्ग, प्रत्यय तथा समास,
　　लिंग निर्णय, पर्यायवाची भाब्द, विलोम भाब्द, अनेक भाब्दों के लिए एक भाब्द,
　　भाब्द भ्ाुद्धि, वाक्य भ्ाुद्धि, मुहावरे और लोकोक्तियां, पल्लवन एवं संक्षेपण।

इकाई –2　संप्रेषण (संचार)
　　–संप्रेषण की अवधारणा और महत्व, संप्रेषण के लिए आव?यक भार्ते, संप्रेषण के प्रकार,
　　संप्रेषण का माध्यम, संप्रेषण कला, संप्रेषण की तकनीक, वाचन कला, समाचार वाचन,
　　साक्षात्कार कला, रचनात्मक लेखन का लक्ष्य, रचनात्मक लेखन का आधार, भाव और
　　विचारों की प्रस्तुति, वाक् कला की उपयोगिता।

अनुशंसित पुस्तकें :–

- वृहत व्याकरण भास्कर　　　　　　: डॉ0 वचनदेव कुमार
- वृहत निबंध भास्कर　　　　　　: डॉ0 वचनदेव कुमार
- आधुनिक हिन्दी व्याकरण और रचना　　: डॉ0 वासुदेव नन्दन प्रसाद
- रचना मानस　　　　　　　　: प्रो0 रामेश्वर नाथ तिवारी
- व्यवहारिक हिन्दी　　　　　　: डॉ0 जंग बहादुर पाण्डेय
- रचनात्मक लेखन　　　　　　: डॉ0 रमेश गौतम
- राजहंस हिन्दी निबंध　　　　: प्रो0 आर0 एन0 गौड़
- सफल हिन्दी निबंध　　　　　: रत्नेश्वर
- निबंध सहचर　　　　　　　: डॉ0 लक्ष्मण प्रसाद
- उपकार मुहावरे और लोकोक्तियाँ　　: प्रो0 राजेश्वर प्रसाद चतुर्वेदी
- कहानियों कहावतों की　　　　: प्रताप अनम
- सम्प्रेषणपरक हिन्दी भाषा शिक्षण　: डॉ0 वैशना नारंग
- शैली विज्ञान　　　　　　　: डॉ0 सुरेश कुमार
- शैली विज्ञान प्रतिमान और विश्लेषण　: डॉ0 पांडेय शशिभूषण 'शीतांशु'
- भौली विज्ञान का इतिहास　　　: डॉ0 पांडेय शशिभूषण 'शीतांशु'

Session 2019-22 onwards

[B]   MATRI BHASHA COMMUNICATION   Theory: 15 Lectures

मातृभाषा संप्रेषण (संचार)   Marks : 50 (ESE 1.5 Hrs) = 50   (क्रेडिट: सैद्धान्तिक -01)

[B 1] BENGALI COMMUNICATION   OR

[B 2] SANSKRIT COMMUNICATION   OR

[B 3] URDU COMMUNICATION   OR

[B 4] TRL COMMUNICATION   OR

[B 5] AECC ENGLISH   Theory: 15 Lectures

Marks : 50 (ESE 1.5 Hrs) = 50	Pass Marks Th ESE = 20

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 of 5 marks each. **Group B will contain descriptive type** three questions of 20 marks each, out of which any two are to answer.

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

Unit I: Novel

1. The English Teacher (R.K. Narayan)

Unit II: Poetry
1. Stopping by words on a Snowy Evening (Robert Frost)
2. A slumber did My Sprit Seal (William Woodworth)
3. My Native Land (H.L.V. Derozio)
4. The Night of Scorpion (Nissim Ezekiel)
5. Break, Break, Break (A.L. Tennyson)
6. Starlit Night (G.M. Hopkins)

Unit III: Grammer
1. Common Errors
2. Fill up the blanks with prepositions.
3. One word substitution.
Suggested Reading:

- ☐ A String of Poems (Edited by: S.M.P.N. Singh Sashi and A.B.Sharan)
- ☐ The Winged Word (Edited by: David Green)

Distribution of Credits Semester wise for Undergraduate Honours Courses

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

Semester wise distribution of 164 Credits

	CC	AECC	GE-A	GE-B	SEC	DSE	Total credits
Semester I	12	02	06	06			20
Semester II	12	02	06	06			20
Semester III	18		06	06	02		26
Semester IV	18		06	06	02		26
Semester V	12					12	24
Semester VI	12					12	24
	84	**04**	**24**	**24**	**04**	**24**	**140 + 24 = 164**

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.Sc./B.A./B.Com/B.Voc. 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-1A	06	B	6	36	
GE-1B	06	B+	7	42	
Total	**26**			**180**	**6.92 (180 / 26)**
Semester II					
C-3	06	B	6	36	
C-4	06	C	5	30	
AECC-2	02	B+	7	14	
GE-2A	06	A+	9	54	
GE-2B	06	B+	7	42	
Total	**26**			**176**	**6.76 (176 / 26)**
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-3A	06	0	10	60	
GE-3B	06	B+	7	42	
Total	**32**			**280**	**8.75 (280 / 32)**
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-4A	06	A	8	48	
GE-4B	06	B+	7	42	
Total	**32**			**234**	**7.31 (234 / 32)**
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+24=164**			**1248**	**7.61 (1248 / 164)**

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

Semester I	Semester II	Semester III	Semester IV	Semester V	Semester VI
Credit:26; SGPA:6.92	Credit:26; SGPA: 6.76	Credit:32; SGPA: 8.75	Credit:32; SGPA: 7.31	Credit:24; SGPA: 7.75	Credit:24; SGPA: 8.0

Thus CGPA= (26x6.92+26x6.76+32x8.75+32x7.31+24x7.75+24x8.0)/164=**7.61**

Session 2019-22 onwards

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 including Mid Sem	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	30	3 Hrs	Q.No.1 (10x1) + 1x5 =15	3 (out of 5) x15 =45	2	5
	T75	75	40	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.

Session 2019-22 onwards

FORMAT OF QUESTION PAPER FOR MID SEM EXAMINATION

OF

SUBJECTS WITH PRACTICAL

Ranchi University, Ranchi

Mid Sem <u>No.</u>   Exam <u>Year</u>

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** 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. ....   [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 <u>No.</u>   Exam <u>Year</u>

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** 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. ....   [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 <u>No.</u>   Exam <u>Year</u>

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 प्र न हैं।)
 ii. **Answer 2 out of 3** subjective/ descriptive questions given **in Group B**.
   (खंड 'B' के तीन में से किन्हीं दो वि यनि ठ/ वर्णनात्मक प्र नों के उत्तर दें।)
 iii. Answer in your own words as far as practicable.
   (यथासंभव अपने भाब्दों में उत्तर दें।)
 iv. Answer all sub parts of a question at one place.
   (एक प्र न 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 <u>No.</u>   Exam <u>Year</u>

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** subjective/ descriptive questions given in **Group B**.
       (खंड 'B' के पाँच में से किन्हीं तीन 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.   ....   [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 <u>No.</u>   Exam <u>Year</u>

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 वि ायनि ठ/ वर्णनात्मक प्र नों के उत्तर दें।)
   iii. Answer in your own words as far as practicable.
        (यथासंभव अपने भाब्दों में उत्तर दें।)
   iv. Answer all sub parts of a question at one place.
        (एक प्र न 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 <u>No.</u>   Exam <u>Year</u>

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.