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URGENT

No.7427 /ACD-I (BOS)

Date: 07.08.14

To

The Principals,

(All the Affiliated Colleges under Sambalpur University having
Three Year Degree Courses including Autonomous Colleges.)

Sub: Courses of Studies for **Three Year Degree Course in Arts/Science/Commerce (Pass and Hons.) due to start from the Academic Session 2014-15.**

Sir / Madam,

With reference to the subject cited above, I am directed to intimate you that, in exercise of the power of the Academic Council under section 6 (15) of O.U. Act- 1989 the Vice- Chancellor has approved Courses of Studies for **Three Year Degree Courses in Arts/Science/Commerce (Pass & Honours) Examination – 2017 (i.e. First University Examination 2015, Second University Examination- 2016 and Final University Examination-2017)** effective from the Academic Session, 2014-15. The details regarding the said Courses of Studies are mentioned below and the approved changes are enclosed in the Appendix/ Appendices.

A. Three Year Degree Arts. (Pass and Hons.) Examination – 2017 (i.e. First University Examination 2015, Second University Examination 2016 and Final University Examination 2017)

Syllabus & Books | ***No Change, Same as the Previous Examination except the followings:***

- 1. N.C.C. has been introduced as an Elective Subject in Three Year Degree Arts course to be effective from the academic session 2014-15.***

Detailed syllabus and Books | As in Appendix-A

- 2. Three Year Degree Arts- English (Hons.) to be effective from the academic session 2014-15.***

Syllabus and Books | No change; same as the previous examination, except the changes mentioned in Appendix-B .

- 3. Three Year Degree Arts-Mathematics (Pass & Hons.) to be effective from the academic session 2014-15.***

Syllabus and Books | Revised as in Appendix-C

- 4. Three Year Degree Arts-Sociology (Hons. & Elective) to be effective from the academic session 2014-15.***

Syllabus and Books | No change; same as the previous examination, except the changes mentioned in Appendix-D .

P.T.O.

5. Three Year Degree Arts-Philosophy (Pass & Hons.) to be effective from the academic session 2014-15.

Syllabus and Books	Revised as in Appendix-E
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6. Three Year Degree Arts-Odia (Hons.) to be effective from the academic session 2014-15.

Syllabus and Books	No change. Same as the previous examination, except the following changes that, in Paper No. VII (+3 Arts Hons.) Unit-4 " <i>Aai Maa Kahani O Gaudi Galpa</i> " be replaced by " <i>Loka Galpara Sangaya, Swarupa, LOka Galpara Prakara Bheda</i> "
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B. Three Year Degree Science. (Pass and Hons) Examination – 2017 (i.e. First University Examination 2015, Second University Examination 2016 and Final University Examination 2017)

Syllabus & Books	No Change, Same as the Previous Examination except the followings:
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1. Three Year Degree Science -Mathematics (Pass & Hons.) to be effective from the academic session 2014-15.

Syllabus and Books	Revised as in Appendix-C
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2. Three Year Degree Science -English (Compulsory) to be effective from the academic session 2014-15.

Syllabus and Books	Revised as in Appendix-F
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3. Three Year Degree Science -Physics (Pass & Hons.) to be effective from the academic session 2014-15.

Syllabus and Books	No change. Same as the previous examination, except the of followings :- that, (+3 Science – Physics - Pass.) in Paper No. IV (b) " <i>Elements of digital electronics, Logic gate and Boolean algebra</i> " be included. Also (+3 Science – Physics - Hons.) in Paper No. X (a) " <i>Elements of digital electronics, Logic gate, Boolean algebra ,K- map, Half adder and full adder</i> " be included.
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4. Three Year Degree Science -Zoology (Pass & Hons.) to be effective from the academic session 2014-15.

Syllabus and Books	No change. Same as the previous examination, except the of followings :- That, " <i>Determination of O₂ content by Winklen's method</i> " be deleted from Zoology (Pass) Paper- VI and be incorporated in Zoology (Hons.) Paper- VI .
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Cont.

C. Three Year Degree Commerce (Pass and Hons.) Examination –2017 (i.e. First University Examination 2015, Second University Examination 2016 and Final University Examination 2017)

Syllabus & Books | **No Change, Same as the Previous Examination except the followings:**

- 1. Three Year Degree Commerce –Communicative English to be effective from the academic session 2014-15.**

Syllabus and Books | Revised as in **Appendix-G**

The revised syllabus may kindly be made available to the concerned teachers and students of your college/ department/ institution and you are requested to ensure teaching of the courses accordingly. A copy of it may be displayed for information of all concerned. The complied syllabus in soft copy form will be send latter on by e- dispatch.

Any error and omission etc. may kindly be intimated to this office.

This is for your kind information and necessary action.

Yours faithfully

Encl: As above.

Sd/-

Asst. Controller of Examinations (P)

Memo No.7428/Acd.-I(BOS),

dated. 07.08.2014

Copy forwarded with enclosure for information and necessary action to:

1. The Director, Directorate of Distance and Continuing Education, Sambalpur University.
2. The Co-ordinator, Private Examination Cell, Sambalpur University.
3. Dy. Director, e-Governance Cell, Sambalpur University for necessary steps for updating the concerned web-pages.
4. P.A. to Controller of Examinations, Sambalpur University.
5. Asst. Registrar (Examination), Sambalpur University.
6. Section Officer, E.G.-I/ E.G.-II/ E.C.-I/ E.C.-II/ E.C.-VI Sections/Computer Unit, Sambalpur University.
1. Ten spare Copies for Academic-I Sections.

Sd/-

Asst. Controller of Examinations (P)

Detailed syllabus N.C.C., which has been introduced as an Elective Subject in Three Year Degree Arts course to be effective from the academic session 2014-15.

Paper- I

100 Marks

Theory 150 Marks 2hr Practical 50 Marks Total 200 Marks - Reduced to 100 Marks

Unit I - NCC ORGANISATION 15 Marks Aims and Objectives of NCC. Organization of NCC.

NCC song. Incentives of NCC. Certificate Examinations in NCC.

Unit II - NATIONAL INTEGRATION 20 Marks Religions, Culture, Traditions and Customs of India.

National Integration Importance and Necessity. Freedom Struggle and Nationalist Movement in India. National Interests, Objectives, Threats and Opportunities.

Unit III -DRILL-FOOT DRILL BASICS(75% Practical Training) Theory-25Marks Practical- 2S Marks Drill ki

Aam Hidayaten Aur Words of Command. Savdhan, Vishram, Aram Se aur Mudna. Kadwar Sizing, Teen line banana, Khuli line aur Nikat Line. Khade Khade Salute Karna, Parade Par, Visarjan aur Line tod. Tej chal Tham aur Dhire Chal. Dahine Baen Age aur Piche Kadam lena. Tej Chal Se Mudna. Tej Chal se Salute Kama. Kadam Badalna. Teenon Teen se Ek file aur Ek file se Teeno Teen Banana.

Unit IV- WEAPON TRAINING (75% Practical Training) Theory-25 Marks Practical- 20 Marks Characteristics of

a Rifle and Its Ammunition. Stripping, Assembling, Cleaning and Sight Setting of .22 Rifle. Loading, Cocking and Unloading. Lying Position, Holding and Aiming. Trigger Control and Firing a Shot. Range Procedures and Safety Precautions.

Unit V- DISASTER MANAGEMENT & CIVIL AFFAIRS 15 Marks Civil Defence Organisation and NDMA.

Types of Emergencies/Natural Disasters. Fire Services & Fire Fighting. Traffic Control During disaster Under Police Supervision.

Unit VI SOCIAL AWARENESS AND COMMUNITY DEVELOPMENT 15 Marks Basics of Social Service and

Its Need. Rural Development Programmes-MNREGA, SGSY, NSAP etc. NGOs Role & Contribution. Contribution of Youth towards Social Welfare.

Unit VII -HEALTH & HYGIENE 15 Marks Structure and Functioning of the Human Body.

Hygiene and Sanitation. Physical and Mental Health. Infectious and Contagious diseases. First Aid In Common Medical Emergencies.

Unit VIII -ENVIRONMENT AWARENESS AND CONSERVATION 5 Marks Natural Resources- Conservation and Management. Water Conservation and Rain Water Harvesting

Unit X - OBSTACLE TRAINING(100% Practical training) Practical 5 Marks

Unit XI- PERSONALITY DEVELOPMENT AND LEADERSHIP 10 Marks Introduction to Personality Development. Factors Influencing/Shaping Personality. Self Awareness. Change your mind set. Interpersonal Relationship and Communication. Communication Skills.

Paper- II

100 Marks

Marks scored in 'B' Certificate Exam (Max Marks 500) to be reduced out of 100.

Unit I -NCC ORGANISATION Revision of -Aims and Objectives of NCC. Organization of NCC. Incentives of NCC.

Unit II- NATIONAL INTEGRATION Problems/Challenges of National Integration. Unity in diversity. National Integration Council. Images/Slogans for National Integration. Contribution of Youth in Nation Building.

Unit III- ARMS DRILL BASICS(75% Practical) Rifle ke Sath Savdhan, Vishram Aur Aram se. Rifle ke Sath Parade Par Aur Saj. Rifle ke Sath Visarjan Aur Line Tod. Bhumi Shastra Aur Uthao Shastra. Salami Shastra. Squad Drill. Nirikshan I ke lie Janch Shastra aur Baju Shastra.

Unit IV -WT(75% Practical) Revision of -Cocking and Unloading. Lying Position, Holding and Aiming. Trigger Control and Firing a Shot. Range Procedures and Safety Precautions. New topics- Theory of Group and Snap Shooting. Short Range Firing, Aiming, Alteration of Sight.

Unit V -DISASTER MANAGEMENT & CIVIL AFFAIRS Essential Services and their Maintenance. Assistance During Natural/Other Calamities. Setting up of Relief Camp. Collection and Distribution of Aid Material.

Unit VI- SOCIAL AWARENESS AND COMMUNITY DEVELOPMENT Family Planning. Drug Abuse and Trafficking. Civic Responsibilities. Causes and Prevention of HIV/AIDS and Role of Youth. Counter Terrorism. Corruption. Social Evils-Female Foeticide, Dowry, Child Abuse/Trafficking. RTI & RTE. Traffic Control Organisation and Anti Drunken Driving. Provisions of Protection of Children from Sexual Harassment Act 2012.

Unit VII- HEALTH & HYGIENE Revision of-Structure and Functioning of the Human Body. First Aid In Common Medical Emergencies. New Topics- Treatment and Care of Wounds. Introduction to Yoga Exercises.

Unit VI,-" ENVIRONMENT AWARENESS AND CONSERVATION Waste Management. Pollution • Control. Energy Conservation. Wildlife Conservation & Projects in India.

Unit IX -ADVENTURE TRAINING(~5% Practical) Revision and Practice-Para sailing. Slithering.
Rock climbing. Cycling and trekking.

Unit X- OBSTACLE TRAINING(100% Practical) Revision and Practice.

Unit XI PERSONALITY DEVELOPMENT AND LEADERSHIP Revision- Self Awareness.

Communication Skills. New Topics- Leadership Traits. Types of Leadership. Attitude Assertiveness and Negotiation. Time Management. Effects of Leadership with Historical Examples. Stress Management Skills.

Appendix- B

Changes in +3 Arts English (Honours) course (*be effective from the academic session 2014-15.*)

Paper-I

Paul Pulaski's English Literature in Context (Clkfdslk) be included in Books Recommended:

Paper VII shall be replaced by the following:-

Paper VII-

The title "History of English Language" be renamed an "English as a Global Language". The following items be studied;

1. Why a Global Language
2. What is a Global Language
3. Why English (The Historical Context)
4. Origins
5. South Asia
6. A world view

Division of marks be the same.

Books Recommended: (To be replaced by the following) David Crystal's English as a Global Language (Cambridge University Press)

The book can be freely downloaded from the website.

+3 Arts (Honours)

Paper II shall be replaced by the following:

Paper II: Genres, Terms and Concepts, 100 Marks.

- (a) Epic, Tragedy, Comedy, Lyric
- (b) Simile, Metaphor, Image, Symbol, Metonymy, Synecdoche
- (c) Irony, Paradox, Satire, Allegory,

Division of many and books recommended remain the same as the Paper VII of previous syllabus.

Appendix- C

REVISED SYLLABUS FOR MATHEMATIC (PASS)(BOTH FOR SCIENCE AND ARTS. STUDENTS)
(To be effective from the academic session 2014-15)

COURSE STRUCTURE:

FIRST UNIVERSITY EXAMINATION			
Paper-I			100
Marks			
	i.	Calculus	50 Marks
	ii.	Linear Algebra	50 Marks
Paper-II			100
Marks			
	i.	Differential Equation	50 Marks
	ii.	Programming in C	50 Marks
SECOND UNIVERSITY EXAMINATION			
Paper-III			100
Marks			
	i.	Analysis	50 Marks
	ii.	Vector Calculus	50 Marks
Paper-IV			100
Marks			
	i.	Algebra	50 Marks
	ii.	Numerical Analysis	50 Marks

FINAL UNIVERSITY EXAMINATION

There shall be no examination in Mathematics (Pass) in the Final University Examination.

- N.B.**
- i. Each paper consists of five units
 - ii. Numbers in the right hand side indicates marks in the respective topics.

DETAILED SYLLABUS

FIRST UNIVERSITY EXAMINATION

PAPER-I

Full Marks – 100
a. Calculus

50 Marks

Duration -3 hours

Unit-I

- i. Asymptotes, Curvature, Singular Points, Curve Tracing.
- ii. Partial Differentiation, Maxima Minima of functions of two or more real variables.

Unit-II

Definite Integral, Riemann integral, Length of a curve, Area bounded by curves, Volume and surface of solid of revolution, multiple integrals, Beta function & Gamma Function.

Unit-III

Sphere, Cone, Cylinder, Central conicoids,

Books Prescribed:

- i. Gorakh Prasad: Text Book of Differential Calculus, Pothisala Pvt. Ltd., Allahabad, Ch. 9 10,11 (11.1-11.2), 12,14.
- ii. Gorakh Prasad: Text Book of Integral Calculus, Pothisala Pvt. Ltd., Allahabad, Ch 5 Ch.-6 (6.1-6.3), Ch.-7(7.1-7.2), Ch.-8(8.1-8.3), Ch 9 ,Ch.-10(10.1-10.6).Ch11
- iii. R.N. Das: An Introduction to the Theory of Quadratic Surfaces, Kalyani Publishers. Ch.-I(1.1-1.6, 1.8), Ch.-II(2.1-2.9),Ch.-III(3.1-3.3), Ch.-IV(4.1-4.8), Ch.-V(5.1-5.4).

Reference Books:

- i. J. Edward: A Treatise of Differential Calculus
- ii. Das & Mukherjee: Differential Calculus, U.N. Dhar & Sons., Pvt. Ltd., Calcutta.
- iii. Das & Mukherjee: Integral Calculus, U.N. Dhar & Sons., Pvt. Ltd., Calcutta.
- iv. David Wider: Advanced Calculus, PHI.
- v. P.K. Jain & Khalil Ahmad: Text Book of Analytical Geometry of Three Dimensions, Wiley Eastern Ltd. (New Age International Ltd.), New Delhi.
- vi. R.J.T. Bell: An Elementary Treatise on Co-ordinate Geometry of Three Dimensions ,Macmillan
- vii. Shanti Narayan: Analytical Solid Geometry, S.Chand & Co.
- viii. N. Sharan & L. Gupta: Co-ordinate Geometry in Three Dimensions, Pothisala.

b. Linear Algebra**50 Marks****Unit-IV**

- i. Vector space, subspaces, span of a set Linear dependence and independence, dimension and basis
- ii. Linear transformations :Definition, Examples, Range and Kernel of a map, rank and nullity Rank nullity Theorem and consequences. Inverse of a linear transformation

Unit-V

- iii. Matrix associated with linear maps, Linear map associated with matrix ,Matrix operations, Rank and nullity of Matrix, Transpose and special types of matrices, Elementary row operations, Systems of linear equations, Matrix inversion
- iv. Determinants, fundamental properties, Cofactors, minors, Product of determinants, characteristics roots and eigen values, Inner product space, Orthogonal matrices, Application to reduction to quadrics..

Books Prescribed:

1. V Krishnamurty, VP Mainra, JL Arora- An Introduction to linear Algebra-Affiliated East West Press PVT LTD, New Delhi Ch 3,4,5,6,7

Reference Books:

1. S.K. Hoffman & Ray Kunze: Linear Algebra, PHI
2. S Kumaresan-Linear algebra,a geometric Approach-Prentice Hall of India
3. Rao & Bhimasankarn-Linear Algebra ,Hindustan publishing house

PAPER-II

Full Marks – 100

Duration 3 hours

a. Differential Equations:

50 Marks

Unit-I

- i. Basic concepts of differential equations, First order First Degree equations.
- ii. Solution of equations of First order but of higher degree.

Unit-II

- iii. Solution of Linear equation with constant coefficients.

Unit-III

- iv. Series solution and special functions excluding Bessel functions.

Books Prescribed:

- i. J.Sinha Roy & S. Padhi: Elements of Ordinary Differential Equations with Applications, Kalyani Publishers, New Delhi, Ch.-1,2,3,4 &7.

Reference Books:

- i. D.A. Murray: Introductory Course of Differential Equation, Longman
- ii. Martin Braun: Differential Equation and their Application, Springer International.
- iii. Simmons G F-Differential equations

PROGRAMMING IN C

Unit- IV

Overview of C, constraints, variables & data types operators and expressions, Managing I/O operators

Unit-V

Decision making and branching, looping, arrays, character strings, user defined functions, structure and union,

Books Prescribed:

- 1.E. Balguruswamy: Programming in ANSI C, Ch. -1-10.

SECOND UNIVERSITY EXAMINATION

PAPER-III

Full Marks – 100

Duration 3 hours

A. Analysis

50 Marks

Unit-I

- i. Real Number System, Bounded and unbounded sets, Order completeness, Archimidean Property, Absolute value of a real Number, definition of Metric space, \mathbb{R} as a metric Space,,

- Limit points of sets , Interior points, exterior points and boundary points of a set, Open set, closed set and closure of a set.Countable sets, Uncountable sets
- ii. Sequences and series of real numbers,Limit point of a sequence, limit superior,limit inferior,Convergence of sequences and series, Weierstrass completeness principles, Cauchy General Principle of Convergence, Convergence of series of positive terms. Convergence tests: Comparison test, ratio test, root test, Cauchy condensation Test,Raabe Test,logarithmic test,Absolute convergence, Convergence test for alternating series.

Unit-II

- iii. Limit and Continuity of functions, discontinuity of various type.Uniform continuity
- iv. Differentiation: Differentiable functions, left and right derivatives, ,Rolles Theorem, Intermediate value Theorem ,Lagrange and Cauchy Mean value theorems, Higher derivatives, Taylor's theorem.

Unit-III

- v. Riemann Integration: Definition and existence of Riemann integral, Theorems of integrability, Properties of Riemann integral, Fundamental theorem of calculus. Mean Value Theorem for Integral Calculus.

Books Prescribed:

S.C. Malik and ,Savita Arora: Mathematical Analysis, New Age International Publishers

Reference Books:

1. G. Das & S. Pattnayak: Fundamentals of Mathematical Analysis, Tata McGraw Hill
2. Richard R. Goldberg: Methods of Real Analysis, Oxford.
3. D. Somasundarm & B. Choudhury: A First Course in Mathematical Analysis, Narosa Publishing House.
4. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi.
5. Alton, H. Smith & Walter A. Albrecht,Jr.: Fundamental Concepts of Analysis, PHI.

B. Vector Calculus

50 Marks

Unit-IV Vector Differential calculus: Scalar fields and vector fields, Vector calculus, Curves Arc length, Tangent, Velocity and acceleration, Directional Derivative, Gradient of a scalar field, Transformation of coordinate system of vector components, Divergence of a vector field, Curl of a vector field.

Unit-V Line Integrals: Integral theorems, Line integrals, Evaluation of line integrals, Double integrals, Transformation of double integral into line integrals.

Surfaces Tangent plane, First fundamental forms, Area Surface integrals: Triple integrals, Divergence theorem of Gauss, application of divergence theorem, Stokes theorem, application of Stokes theorem, Line integrals independent of path.

Books Prescribed:

1. Erwin Kreyszig: Advance Engineering Mathematics, Wiley Eastern Ltd., Ch.-8 Ch.-9

Reference Books:

1. S.C. Malik and ,Savita Arora: Mathematical Analysis, New Age International Publishers
2. M D Raisinghanian Vector Analysis ,S Chand and Company Limited

PAPER-IV

Full Marks – 100

Duration 3 hours

a. Algebra:**50 Marks****Unit-I**

- i. Group Theory: Definition and examples, subgroups, Counting principle, Normal subgroups, quotient groups, Homomorphism.

Unit-II

- ii. Ring Theory: Definition and examples, some special classes of rings, Homomorphism, Ideals and quotient rings. Euclidean Ring, Polynomial rings
- iii. Theory of Equations: Roots of equations, Relation between roots and coefficients, evaluating the roots of cubic and bi-quadratic equations, character and position of the root of an equation
Descartes rule of signs

Books Prescribed:

1. I.N. Herstein: Topics in Algebra, Wiley India, New Delhi, Ch.-2 (2.1-2.7).Ch3
2. S Barnad and J M Child-Higher Algebra-MacMillan vchapter VI

Reference Books:

1. J.B., Fraleigh: A first Course in Abstract Algebra, Addison – Wesley Publ. Company.
2. Galian-Contemporary Abstract Algebra, Narosa Publishing house

b. Numerical Analysis:**50 Marks****Unit-III**

Errors, Root finding by Bisection method, Root finding by Iteration methods based on first degree equations: Secant method, Regula-Falsi method, Newton Raphson method (without rates of Convergence and order of convergence)
Numerical Solution of system of linear equations: Direct methods, Cramer's rule, Gauss Elimination methods, Gauss-Jordan Elimination method

Interpolations: Lagrange and Newton interpolations, Finite difference operators, Interpolating polynomials using finite differences,

Unit-IV

Differentiation: Methods based on Interpolation (linear and quadratic interpolation with non-uniform and uniform nodal points without error analysis), Methods based on Finite Differences (without error analysis).

Integration: Methods based on Interpolation (Trapezoidal rule with error term, Simpson's rule with error term, Composite integration methods).

Unit-V

Numerical solution of ordinary differential equation: Euler Method, Backward Euler method, Range-Kutta method (Second order, Fourth order method) (All these methods without convergence and error analysis)

Books Prescribed:

M.K. Jain, S.R.K Iyengar, R.K. Jain: Numerical Methods for Scientific and Engineering Computation, Willey Eastern Ltd. New Delhi (1995)
Chapter 1 (1.3), Chapter 2 (2.2, 2.3), Chapter 3 (3.2), Chapter 4 (4.2, 4.3, 4.4), Chapter 5 (5.2, 5.7, 5.9), Chapter 6 (6.3, 6.4).

Reference Books:

1. S.S. Sastry: Introductory Methods of Numerical Analysis, PHI, New Delhi.
2. R.G. Stanton: Numerical Methods for Scientists & Engineers, PHI
3. S.D. Conte and Carl de Boor: Elementary Numerical Analysis, McGraw Hill, Kogakusha Ltd.

MATHEMATIC (HONS) (FOR BOTH ARTS & SCIENCE STUDENTS)
(WITH PRACTICAL COMPONENT)

COURSE STRUCTURE:**FIRST UNIVERSITY EXAMINATION**

Paper-I		75 Marks
	a. Calculus	40 Marks
	b. Linear Algebra	35 Marks
Paper-II		75 Marks
	a. Differential Equation	40 Marks
	b. Programming in C	35 Marks
Paper-III	Practical: Windows/DOS/UNIX/MS-Office Programming in C	50 Marks

SECOND UNIVERSITY EXAMINATION

Paper-IV		75 Marks
	a. Analysis	40 Marks
	b. Vector Calculus	35 Marks
Paper-V		75 Marks
	a. Algebra	40 Marks
	b. Numerical Analysis	35 Marks
Paper-VI	Practical: Solution of Numerical Problems in C	50 Marks

FINAL UNIVERSITY EXAMINATION

Paper-VII		75 Marks
	a. Probability	40 Marks
	b. Differential Geometry	35 Marks
Paper-VIII	a. Discrete Mathematical structure	40 Marks
	b. Linear Programming	35 Marks
Paper-IX		75 Marks
	a. Complex Analysis	40 Marks
	b. Partial Differential Equation	35 Marks
Paper-X	Object Oriented Programming with C++	75 Marks
Paper-XI	Practical on C++ & Solution of Numerical Problems in C++	100 Marks

N.B. i. Each paper consist of five units.

ii. Numbers in the right hand side indicates marks in the respective topics.

FINAL UNIVERSITY EXAMINATION

There shall be no examination in Mathematics (Pass) in the Final University Examination.

- N.B.**
- i. Each paper consists of five units
 - ii. Numbers in the right hand side indicates marks in the respective topics.

DETAILED SYLLABUS

FIRST UNIVERSITY EXAMINATION

PAPER-I

Full Marks – 100

Duration -3 hours

c. Calculus

40 Marks

Unit-I

- iii. Asymptotes, Curvature, Singular Points, Curve Tracing.
- iv. Partial Differentiation, Maxima Minima of functions of two or more real variables.

Unit-II

Definite Integral, Riemann integral, Length of a curve, Area bounded by curves, Volume and surface of solid of revolution, multiple integrals, Beta function & Gamma Function.

Unit-III

Sphere, Cone, Cylinder, Central conicoids,

Books Prescribed:

- iv. Gorakh Prasad: Text Book of Differential Calculus, Pothisala Pvt. Ltd., Allahabad, Ch. 9 10,11 (11.1-11.2), 12,14.
- v. Gorakh Prasad: Text Book of Integral Calculus, Pothisala Pvt. Ltd., Allahabad, Ch 5 Ch.-6 (6.1-6.3), Ch.-7(7.1-7.2), Ch.-8(8.1-8.3), Ch 9 ,Ch.-10(10.1-10.6).Ch11
- vi. R.N. Das: An Introduction to the Theory of Quadratic Surfaces, Kalyani Publishers. Ch.-I(1.1-1.6, 1.8), Ch.-II(2.1-2.9),Ch.-III(3.1-3.3), Ch.-IV(4.1-4.8), Ch.-V(5.1-5.4).

Reference Books:

- ix. J. Edward: A Treatise of Differential Calculus
- x. Das & Mukjherjee: Differential Calculus, U.N. Dhar & Sons., Pvt. Ltd., Calcutta.
- xi. Das & Mukjherjee: Integral Calculus, U.N. Dhar & Sons., Pvt. Ltd., Calcutta.
- xii. David Wider: Advanced Calculus, PHI.
- xiii. P.K. Jain & Khalil Ahmad: Text Book of Analytical Geometry of Three Dimensions, Wiley Eastern Ltd. (New Age International Ltd.), New Delhi.
- xiv. R.J.T. Bell: An Elementary Treatise on Co-ordinate Geometry of Three Dimensions, Macmillan
- xv. Shanti Narayan: Analytical Solid Geometry, S.Chand & Co.
- xvi. N. Sharan & L. Gupta: Co-ordinate Geometry in Three Dimensions, Pothisala.

d. Linear Algebra

35 Marks

Unit-IV

- v. Vector space,subspaces, span of a set Linear dependence and independence, dimension and basis
- vi. Linear transformations :Definition, Examples, Range and Kernel of a map, rank and nullity Rank nullity Theorem and consequences.Inverse of a linear transformation

Unit-V

- vii. Matrix associated with linear maps,Linear map associated with matrix ,Matrix operations, Rank and nullity of Matrix, Transpose and special types of matrices, Elementary row operations,Systems of linear equations, Matrix inversion

- viii.Determinants, fundamental properties, Cofactors, minors, Product of determinants,characteristics roots and eigen values, Inner product space, Orthogonal matrices, Application to reduction to quadrics..

Books Prescribed:

1. V Krishnamurty,VP Mainra,JL Arora- An Introduction to linear Algebra-Affiliated East West Press PVT LTD,New Delhi Ch 3,4,5,6,7

Reference Books:

4. S.K. Hoffman & Ray Kunze: Linear Algebra, PHI
5. S Kumaresan-Linear algebra,a geometric Approach-Prentice Hall of India
6. Rao & Bhimasankarn-Linear Algebra ,Hindustan publishing house

PAPER-II

Full Marks – 100

Duration 3 hours

b. Differential Equations:

40 Marks

Unit-I

- iii. Basic concepts of differential equations, First order First Degree equations.
- iv. Solution of equations of First order but of higher degree.

Unit-II

- iii. Solution of Linear equation with constant coefficients.

Unit-III

- iv. Series solution and special functions excluding Bessel functions.

Books Prescribed:

- ii. J.Sinha Roy & S. Padhi: Elements of Ordinary Differential Equations with Applications, Kalyani Publishers, New Delhi, Ch.-1,2,3,4 &7.

Reference Books:

- iv. D.A. Murray: Introductory Course of Differential Equation, Longman
- v. Martin Braun: Differential Equation and their Application, Springer International.
- vi. Simmons G F-Differential equations

PROGRAMMING IN C

35 Marks

Unit- IV

Overview of C, constraints, variables & data types operators and expressions, Managing I/O operators

Unit-V

Decision making and branching, looping, arrays, character strings, user defined functions, structure and union,

Books Prescribed:

1.E. Balguruswamy: Programming in ANSI C, Ch. -1-10.

PAPER-III

Practical: Windows/DOS/UNIX/MS-Office

50 Marks

Programming in C

The following Practicals should be done in addition to wrking with operating systems like UNIXand WINDOWS and prepare documents, tabulation using MS Office

1. Program to find sum of digits of a given number
2. Program to find ascending order of some numbers
3. Program to generate Fabinacci sequences
4. Program to compute factorial of a number
5. Program to test whether a number is prime or not
6. Program to find roots of a quadratic equation
7. Proram to gind GCD and LCM of two numbers
8. Program to find all the factors of a number
9. Program to check whether a number is palindrome
10. Program to generate PASCAL's Triangle
11. Program to find slope and midpoint of a line passing through two given points
12. Program to find the product of two complex numbers
13. Program to find addition of two matrices
14. Program to find multiplication of two matrice
15. Program to find Matrix Inverse
16. Program to find sum of the diagonal elements of a square matrix

SECOND UNIVERSITY EXAMINATION

PAPER-III

Full Marks – 100

Duration 3 hours

C. Analysis

40 Marks

Unit-I

- vi. Real Number System, Bounded and unbounded sets, Order completeness, Archmidean Property, Absolute value of a real Number, definition of Metric space, \mathbb{R} as a metric Space,, Limit points of sets, Interior points, exterior points and boundary points of a set, Open set, closed set and closure of a set. Countable sets, Uncountable sets

- vii. Sequences and series of real numbers, Limit point of a sequence, limit superior, limit inferior, Convergence of sequences and series, Weierstrass completeness principles, Cauchy General Principle of Convergence, Convergence of series of positive terms. Convergence tests: Comparison test, ratio test, root test, Cauchy condensation Test, Raabe Test, logarithmic test, Absolute convergence, Convergence test for alternating series.

Unit-II

- viii. Limit and Continuity of functions, discontinuity of various type. Uniform continuity
 ix. Differentiation: Differentiable functions, left and right derivatives, Rolle's Theorem, Intermediate value Theorem, Lagrange and Cauchy Mean value theorems, Higher derivatives, Taylor's theorem.

Unit-III

- x. Riemann Integration: Definition and existence of Riemann integral, Theorems of integrability, Properties of Riemann integral, Fundamental theorem of calculus. Mean Value Theorem for Integral Calculus.

Books Prescribed:

S.C. Malik and Savita Arora: Mathematical Analysis, New Age International Publishers

Reference Books:

6. G. Das & S. Pattnayak: Fundamentals of Mathematical Analysis, Tata McGraw Hill
7. Richard R. Goldberg: Methods of Real Analysis, Oxford.
8. D. Somasundaram & B. Choudhury: A First Course in Mathematical Analysis, Narosa Publishing House.
9. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi.
10. Alton, H. Smith & Walter A. Albrecht, Jr.: Fundamental Concepts of Analysis, PHI.

D. Vector Calculus

35 Marks

Unit-IV Vector Differential calculus: Scalar fields and vector fields, Vector calculus, Curves Arc length, Tangent, Velocity and acceleration, Directional Derivative, Gradient of a scalar field, Transformation of coordinate system of vector components, Divergence of a vector field, Curl of a vector field.

Unit-V Line Integrals: Integral theorems, Line integrals, Evaluation of line integrals, Double integrals, Transformation of double integral into line integrals.

Surfaces Tangent plane, First fundamental forms, Area Surface integrals: Triple integrals, Divergence theorem of Gauss, application of divergence theorem, Stokes theorem, application of Stokes theorem, Line integrals independent of path.

Books Prescribed:

2. Erwin Kreyszig: Advance Engineering Mathematics, Wiley Eastern Ltd., Ch.-8 Ch.-9

Reference Books:

3. S.C. Malik and Savita Arora: Mathematical Analysis, New Age International Publishers
4. M D Raisinghania Vector Analysis, S Chand and Company Limited

PAPER-IV

Full Marks – 100

Duration 3 hours

c. Algebra:

35 Marks

Unit-I

- iv. Group Theory: Definition and examples, subgroups, Counting principle, Normal subgroups, quotient groups, Homomorphism.

Unit-II

- v. Ring Theory: Definition and examples, some special classes of rings, Homomorphism, Ideals and quotient rings. Euclidean Ring, Polynomial rings
- vi. Theory of Equations: Roots of equations, Relation between roots and coefficients, evaluating the roots of cubic and bi-quadratic equations, character and position of the root of an equation
Descartes rule of signs

Books Prescribed:

3. I.N. Herstein: Topics in Algebra, Wiley India, New Delhi, Ch.-2 (2.1-2.7).Ch3
4. S Barnad and J M Child-Higher Algebra-MacMillan vchapter VI

Reference Books:

3. J.B., Fraleigh: A first Course in Abstract Algebra, Addison – Wesley Publ. Company.
4. Galian-Contemporary Abstract Algebra, Narosa Publishing house

d. Numerical Analysis:

40 Marks

Unit-III

Errors, Root finding by Bisection method, Root finding by Iteration methods based on first degree equations: Secant method, Regula-Falsi method, Newton Raphson method (without rates of Convergence and order of convergence)
Numerical Solution of system of linear equations: Direct methods, Cramer's rule, Gauss Elimination methods, Gauss-Jordan Elimination method
Interpolations: Lagrange and Newton interpolations, Finite difference operators, Interpolating polynomials using finite differences,

Unit-IV

Differentiation: Methods based on Interpolation (linear and quadratic interpolation with non-uniform and uniform nodal points without error analysis), Methods based on Finite Differences (without error analysis).
Integration: Methods based on Interpolation (Trapezoidal rule with error term, Simpson's rule with error term, Composite integration methods).

Unit-V

Numerical solution of ordinary differential equation: Euler Method, Backward Euler method, Range-Kutta method (Second order, Fourth order method) (All these methods without convergence and error analysis)

Books Prescribed:

M.K. Jain, S.R.K Iyengar, R.K. Jain: Numerical Methods for Scientific and Engineering Computation, Willey Eastern Ltd. New Delhi (1995)
Chapter 1 (1.3), Chapter 2 (2.2, 2.3), Chapter 3 (3.2), Chapter 4 (4.2, 4.3, 4.4), Chapter 5 (5.2, 5.7, 5.9), Chapter 6 (6.3, 6.4).

Reference Books:

4. S.S. Sastry: Introductory Methods of Numerical Analysis, PHI, New Delhi.
5. R.G. Stanton: Numerical Methods for Scientists & Engineers, PHI
6. S.D. Conte and Carl de Boor: Elementary Numerical Analysis, McGraw Hill, Kogakusha Ltd.

1. Practical in Numerical Problems in C

Programming in C for the following should be done in favour of the following:

1. Rank of a matrix
2. Determinant of a Matrix
3. Solution of System of linear equation by Crammers Rule
4. Eigen value and Eigen vector of a matrix
5. Bisection method.
6. Regula Falsi method.
7. Newton-Raphson method.
8. Lagrange interpolation.

9. Newton's forward and backward interpolation.
10. Trapezoidal and Simpson one-third rules.
11. Gauss Quadrature.
12. Gauss elimination method.
13. Euler's method.
14. Runge-Kutta's method.

Reference

1. Xevier C, C language and Numerical methods New Age International
2. Press W H, Teukolsky, S A etc: Numerical Recipes in C Cambridge University Press Indian Edition
3. Y Kanitkar Let Us C, BPB Publications

**FINAL UNIVERSITY EXAMINATION
PAPER-VII**

Full Marks – 75

Duration 3 hours

a. Probability**40 Marks**

- Unit-I Sample Sets, Probability, Random Variables, Distribution and expectation of Random Variables, Integer valued Random Variables, Random Variables with density function. Conditioning and independence: Examples of conditioning, Basic formulae.
- Unit-II Mean and variance: Multiplication theorem of variance and co-variance.

Books Prescribed:

1. K.L. Chung: Elementary Probability Theory with Stochastic Processes, Springer International Student Edition, Ch.-2(2.1-2.4), Ch.-4 (4.1-4.5), Ch.-5 (5.1, 5.2, 5.5), Ch.-6 (6.1-6.3).

b. Differential Geometry:**35 Marks**

- Unit-III Theory of space curve: Equation to a curve. Arc length of a curve, Tangential vector. Osculating plane, Normal plane and Rectifying plane, Curvature and torsion and Frenet formulae, Formulae for curvature and torsion. Some theorems on curvature and torsion. Helics.
- Unit-IV Osculating circle: Osculating sphere, spherical indicatrices involute and evolute, Bertrand curves, Co-ordinates in terms of arc-length, Intrinsic equation.
- Unit-V Theory of surfaces: Introduction, Normal line and tangent plane, surface of revolution, characteristics, envelope and edge of regression. Developable surfaces, Fundamental differential form, Angle between two directions. Family of curves. Normal sections. Principal direction: Asymptotic direction, Conjugate directions and Geodesic.

Books Prescribed:

PAPER-VIII

Full Marks – 75

Duration- 3 hours

DISCRETE MATHEMATICAL STRUCTURE

40 Marks

UNIT-I

Discrete Mathematics I. Mathematical induction. Principle of inclusion and exclusion. Pigeon hole principle. Finite combinatorics. Generating functions. Partitions. Recurrence relations. Linear difference equations with constant coefficients.

UNIT-II

Partial and linear orderings. Chains and antichains. Lattices. Distributive lattices. Complementation. Graphs and Planar graphs. Paths and circuits. Hamiltonian paths. Shortest paths. Eulerian paths. Traveling salesman problem. Trees. Spanning trees.

UNIT-III

Truth functional logic and propositional connectives. Switching circuits. Boolean algebras. Duality. Boolean functions. Normal forms. Karnaugh maps. **Books prescribed-**

C L Liu Elements of Discrete Mathematics-, Tata McGrawhill Ch3 , Ch4(4.5-4.6), Ch5 (5.1-5.7) , Ch6 (6.1,6.2,6.5,6.6,6.7) Ch10(10.1-10.7) Ch 12(12.1-12.9)

a. Linear Programming:

UNIT –I

,Linear Programming problem(Mathematical formulation, graphical solution),

UNIT-II

simplex method,Duality in Linear programming,

Prescribed Book:

1. Kanti Swarup, P K Gupta and Man Mohan: Operation Research Sultan Chand and sons. Chapters.- 2,3,4,5,.

PAPER-IX

Full Marks – 75

Duration 3 hours

a. Complex Analysis:

40 Marks

Unit-I Complex Number, Complex plane, Complex Function, Limits and derivatives, Cauchy Riemann equation, Laplace equation, Harmonic Function, Logarithmic function, Analytic Function, Examples of Analytic Function.

Unit-II Complex Integration, Cauchy theorem, Cauchy Integral formula (without proof), Independence of Path Cauchy in equality, Liouville's theorem, Fundamental theorem of algebra, Power Series, Radius of convergence of power series.

Unit-III Taylor's series and Laurent series (without proof), Zeros and singularities, residues, Cauchy's residue theorem (without proof), Evaluation of real integral using residue theorem.

Book Prescribed:

1. Erwin Kreyszig: Advanced Engineering Mathematics, Wiley Eastern Pvt. Ltd., Ch.-12,14,16,17.

Reference Book:

1. S. Punnuswamy: Foundation of Complex Analysis, Narosa Publication House.
2. J.B. Conway: Functions of One Complex Variable, Springer International Student Edition.
3. L.V. Ahlfors: Complex Analysis, McGraw Hill Book Co., New York.

b. Partial Differential Equation:**35 Marks**

Unit-IV Total differential equation, condition of integrability, methods of obtaining primitive, solution in inspection, homogeneous equations, partial differential equation of 1st order: classification of integrals and their geometrical interpretation. Formation of partial differential equation, Lagrange's method of solving linear 1st order equations. Charpit's method for 1st order non-linear equations, standard forms.

Unit-V Linear Partial differential equations with constant coefficients, Homogeneous linear equations, reducible non-homogeneous linear equations.

Prescribed Book:

1. J. Sinha Roy & S. Padhi: A course on Ordinary & Partial Differential Equations, Kalyani Publishers, New Delhi, Ch.-12 & 13.

Reference Book:

1. N.M. Kapoor: A text book on Differential Equation, Pitambar Publication House.

PAPER-X

(OBJECT ORIENTED PROGRAMMING WITH C++)

Full Marks – 75

Duration 3 hours

Unit-I Principles of Object Oriented Programming – Object Oriented Programming paradigm, Basic concept of OOP, benefits of OOP, applications of OOP, Structure of a C++ program- Creating a source file, compiling and linking a C++ program.

Tokens, Expressions and Control structures – Key words. Identifiers, Data types, User defined data types, Derived data types, Symbolic constant, Variables, Operators in C++, Functions in C++ - Functions prototyping, call by reference, return by reference, inline function, default argument, virtual function, function overloading, Classes and Objects Defining class and member function, Structure of a C++ program with class, nesting of member function, memory allocation for objects, static data member, static member function, Friend Function, pointers to data members.

Unit-II Constructions and destructors – default constructor and parameterized constructor, copy constructor, dynamic constructor, constructor with default arguments, dynamic initialization of objects, constructor overloading, destructors and its functions.

Unit-III Operator Overloading and type conversions – Defining operator overloading, overloading unary and binary operators, overloading binary operator, using friend function, manipulation of strings using operators, rules for overloading operators, type conversions.

Unit-IV Inheritance: Extending classes – Defining derived classes, single inheritance, making a private member inheritable, multiple inheritance, Hierarchical inheritance, Hybrid inheritance, Virtual base class, Abstract classes, constructors in derived classes, Nesting of classes.

Unit-V Pointers, Virtual functions and Polymorphism – Pointers to objects, this pointer, pointers to derived classes, virtual functions, pure virtual function.

Prescribed Book:

1. E. Balguruswamy: Object Oriented Programming with C++, Ch.1-9.

Reference Book:

1. Robert: Object Oriented Programming in Turbo C++
2. Venugopal: Lafore Mastering C++
3. Ravichandran: Understanding C++

PAPER-XI
(PRACTICAL ON C++)

Full Marks – 100

Duration 6 hours

The practicals done in First year and Second year should be repeted in C++ in this course.

MATHEMATIC (HONS) (WITHOUT PRACTICAL COMPONENT)
For Colleges having no infrastructure facilities for Computer Practical
(BOTH FOR SCIENCE AND ARTS. STUDENTS)

COURSE STRUCTURE:

FIRST UNIVERSITY EXAMINATION

Paper-I		100
Marks		
	a. Calculus	50 Marks
	b. Linear Algebra	50 Marks
Paper-II		100
Marks		
	a. Differential Equation	50 Marks
	b. Programming in C	50 Marks

SECOND UNIVERSITY EXAMINATION

Paper-III		100 Marks
	a. Analysis	50 Marks
	b. Vector Calculus	50 Marks
Paper-IV		100 Marks
	c. Algebra	50 Marks
	d. Numerical Analysis	50 Marks

FINAL UNIVERSITY EXAMINATION

Paper-V		100 Marks
	a. Probability	50 Marks
	b. Differential Geometry	50 Marks
Paper-VI		100 Marks
	a. Complex Analysis	50 Marks
	b. Partial Differential Equation	50 Marks

Paper-VII	a. Mechanics	50 Marks	100 Marks
	b. Mathematical Method	50 Marks	
Paper-VIII	Any one of the following:		100 Marks
	a. Number Theory		
	b. Graph Theory		
	c. Operation Research		
N.B.	i. Each paper consist of five units.		
	ii. Numbers in the right hand side indicates marks in the respective topics.		

DETAILED SYLLABUS
FIRST UNIVERSITY EXAMINATION
PAPER-I

Full Marks – 100

Duration -3 hours

e. Calculus

50 Marks

Unit-I

- v. Asympotes, Curvature, Singular Points, Curve Tracing.
- vi. Partial Differentiation, Maxima Minima of functions of two or more real variables.

Unit-II

Definite Integral, Riemann integral, Length of a curve, Area bounded by curves, Volume and surface of solid of revolution, multiple integrals, Beta function & Gamma Function.

Unit-III

Sphere, Cone, Cylinder, Central conicoids,

Books Prescribed:

- vii. Gorakh Prasad: Text Book of Differential Calculus, Pothisala Pvt. Ltd., Allahabad, Ch. 9 10,11 (11.1-11.2), 12,14.
- viii. Gorakh Prasad: Text Book of Integral Calculus, Pothisala Pvt. Ltd., Allahabad, Ch 5 Ch.-6 (6.1-6.3), Ch.-7(7.1-7.2), Ch.-8(8.1-8.3), Ch 9 ,Ch.-10(10.1-10.6).Ch11
- ix. R.N. Das: An Introduction to the Theory of Quadratic Surfaces, Kalyani Publishers. Ch.-I(1.1-1.6, 1.8), Ch.-II(2.1-2.9), Ch.-III(3.1-3.3), Ch.-IV(4.1-4.8), Ch.-V(5.1-5.4).

Reference Books:

- xvii. J. Edward: A Treatise of Differential Calculus
- xviii. Das & Mukjherjee: Differential Calculus, U.N. Dhar & Sons., Pvt. Ltd., Calcutta.
- xix. Das & Mukjherjee: Integral Calculus, U.N. Dhar & Sons., Pvt. Ltd., Calcutta.
- xx. David Wider: Advanced Calculus, PHI.
- xxi. P.K. Jain & Khalil Ahmad: Text Book of Analytical Geometry of Three Dimensions, Wiley Eastern Ltd. (New Age International Ltd.), New Delhi.
- xxii. R.J.T. Bell: An Elementary Treaties on Co-ordinate Geometry of Three Dimensions ,Macmillan
- xxiii. Shanti Narayan: Analytical Solid Geometry, S.Chand & Co.
- xxiv. N. Sharan & L. Gupta: Co-ordinate Geometry in Three Dimensions, Pothisala.

f. Linear Algebra**50 Marks****Unit-IV**

- ix. Vector space, subspaces, span of a set Linear dependence and independence, dimension and basis
- x. Linear transformations :Definition, Examples, Range and Kernel of a map, rank and nullity Rank nullity Theorem and consequences. Inverse of a linear transformation

Unit-V

- xi. Matrix associated with linear maps, Linear map associated with matrix, Matrix operations, Rank and nullity of Matrix, Transpose and special types of matrices, Elementary row operations, Systems of linear equations, Matrix inversion

- xii. Determinants, fundamental properties, Cofactors, minors, Product of determinants, characteristics roots and eigen values, Inner product space, Orthogonal matrices, Application to reduction to quadrics..

Books Prescribed:

1. V Krishnamurty, VP Mainra, JL Arora- An Introduction to linear Algebra-Affiliated East West Press PVT LTD, New Delhi Ch 3,4,5,6,7

Reference Books:

7. S.K. Hoffman & Ray Kunze: Linear Algebra, PHI
8. S Kumaresan-Linear algebra, a geometric Approach-Prentice Hall of India
9. Rao & Bhimasankarn-Linear Algebra, Hindustan publishing house

PAPER-II**Full Marks – 100****Duration 3 hours****c. Differential Equations:****50 Marks****Unit-I**

- v. Basic concepts of differential equations, First order First Degree equations.
- vi. Solution of equations of First order but of higher degree.

Unit-II

- iii. Solution of Linear equation with constant coefficients.

Unit-III

- iv. Series solution and special functions excluding Bessel functions.

Books Prescribed:

- iii. J.Sinha Roy & S. Padhi: Elements of Ordinary Differential Equations with Applications, Kalyani Publishers, New Delhi, Ch.-1,2,3,4 &7.

Reference Books:

- vii. D.A. Murray: Introductory Course of Differential Equation, Longman
- viii. Martin Braun: Differential Equation and their Application, Springer International.
- ix. Simmons G F-Differential equations

b. PROGRAMMING IN C**50 Marks****Unit- IV**

Overview of C, constants, variables & data types operators and expressions, Managing I/O operators

Unit-V

Decision making and branching, looping, arrays, character strings, user defined functions, structure and union,

Books Prescribed:

1.E. Balguruswamy: Programming in ANSI C, Ch. -1-10.

SECOND UNIVERSITY EXAMINATION
PAPER-III

Full Marks – 100

Duration 3 hours

a. Analysis

50 Marks

Unit-I

- xi. Real Number System, Bounded and unbounded sets, Order completeness, Archimidean Property, Absolute value of a real Number, definition of Metric space, \mathbb{R} as a metric Space,, Limit points of sets, Interior points, exterior points and boundary points of a set, Open set, closed set and closure of a set. Countable sets, Uncountable sets
- xii. Sequences and series of real numbers, Limit point of a sequence, limit superior, limit inferior, Convergence of sequences and series, Weierstrass completeness principles, Cauchy General Principle of Convergence, Convergence of series of positive terms. Convergence tests: Comparison test, ratio test, root test, Cauchy condensation Test, Raabe Test, logarithmic test, Absolute convergence, Convergence test for alternating series.

Unit-II

- xiii. Limit and Continuity of functions, discontinuity of various type. Uniform continuity
- xiv. Differentiation: Differentiable functions, left and right derivatives, Rolle's Theorem, Intermediate value Theorem, Lagrange and Cauchy Mean value theorems, Higher derivatives, Taylor's theorem.

Unit-III

- xv. Riemann Integration: Definition and existence of Riemann integral, Theorems of integrability, Properties of Riemann integral, Fundamental theorem of calculus. Mean Value Theorem for Integral Calculus.

Books Prescribed:

S.C. Malik and Savita Arora: Mathematical Analysis, New Age International Publishers

Reference Books:

- 11. G. Das & S. Pattnayak: Fundamentals of Mathematical Analysis, Tata McGraw Hill
- 12. Richard R. Goldberg: Methods of Real Analysis, Oxford.
- 13. D. Somasundaram & B. Choudhury: A First Course in Mathematical Analysis, Narosa Publishing House.
- 14. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi.
- 15. Alton, H. Smith & Walter A. Albrecht, Jr.: Fundamental Concepts of Analysis, PHI.

b. Vector Calculus

50 Marks

Unit-IV

Vector Differential calculus: Scalar fields and vector fields, Vector calculus, Curves Arc length, Tangent, Velocity and acceleration, Directional Derivative, Gradient of a scalar field,

Transformation of coordinate system of vector components, Divergence of a vector field, Curl of a vector field.

Unit-V Line Integrals: Integral theorems, Line integrals, Evaluation of line integrals, Double integrals, Transformation of double integral into line integrals.

Surfaces Tangent plane, First fundamental forms, Area Surface integrals: Triple integrals, Divergence theorem of Gauss, application of divergence theorem, Stokes theorem, application of Stokes theorem, Line integrals independent of path.

Books Prescribed:

3. Erwin Kreyszig: Advance Engineering Mathematics, Wiley Eastern Ltd., Ch.-8 Ch.-9

Reference Books:

5. S.C. Malik and ,Savita Arora: Mathematical Analysis, New Age International Publishers
6. M D Raisinghania Vector Analysis ,S Chand and Company Limited

PAPER-IV

Full Marks – 100

Duration 3 hours

e. Algebra:

50 Marks

Unit-I

vii. Group Theory: Definition and examples, subgroups, Counting principle, Normal subgroups, quotient groups, Homomorphism.

Unit-II

viii. Ring Theory: Definition and examples, some special classes of rings, Homomorphism, Ideals and quotient rings. Euclidean Ring, Polynomial rings

ix. Theory of Equations: Roots of equations, Relation between roots and coefficients, evaluating the roots of cubic and bi-quadratic equations, character and position of the root of an equation Descartes rule of signs

Books Prescribed:

5. I.N. Herstein: Topics in Algebra, Wiley India, New Delhi, Ch.-2 (2.1-2.7).Ch3
6. S Barnad and J M Child-Higher Algebra-MacMillan vchapter VI

Reference Books:

5. J.B., Fraleigh: A first Course in Abstract Algebra, Addison – Wesley Publ. Company.
6. Galian-Contemporary Abstract Algebra, Narosa Publishing house

f. Numerical Analysis:

50 Marks

Unit-III

Errors, Root finding by Bisection method, Root finding by Iteration methods based on first degree equations: Secant method, Regula-Falsi method, Newton Raphson method(without rates of Convergence and order of convergence)

Numerical Solution of system of linear equations: Direct methods, Cramer’s rule, Gauss Elimination methods, Gauss-Jordan Elimination method

Interpolations: Lagrange and Newton interpolations, Finite difference operators, Interpolating polynomials using finite differences,

Unit-IV

Differentiation: Methods based on Interpolation (linear and quadratic interpolation with non-uniform and uniform nodal points without error analysis), Methods based on Finite Differences(without error analysis).

Integration: Methods based on Interpolation(Trapezoidal rule with error term , Simpson's rule with error term, Composite integration methods.

Unit-V

Numerical solution of ordinary differential equation: Euler Method, Backward Euler method, Range-Kutta method(Second order, Fourth order method)(All these methods without convergence and error analysis)

Books Prescribed:

M.K. Jain , S.R.K Iyengar, R.K. Jain: Numerical Methods for Scientific and Engineering Computation , Willey Eastern Ltd. New Delhi (1995)
Chapter 1 (1.3), Chapter 2 (2.2, 2.3), Chapter 3(3.2), Chapter 4(4.2,4.3,4.4), Chapter 5(5.2, 5.7,5.9), Chapter 6(6.3,6.4).

Reference Books:

7. S.S. Sastry: Introductory Methods of Numerical Analysis, PHI, New Delhi.
8. R.G. Stanton: Numerical Methods for Scientists & Engineers, PHI
9. S.D. Conte and Carl de Boor: Elementary Numerical Analysis, McGraw Hill, Kogakusha Ltd.

FINAL UNIVERSITY EXAMINATION

PAPER-V

Full Marks – 100

Duration 3 hours

a. Probability

50 Marks

Unit-I Sample Sets, Probability, Random Variables, Distribution and expectation of Random Variables, Integer valued Random Variables, Random Variables with density function. Conditioning and independence: Examples of conditioning, Basic formulae.

Unit-II Mean and variance: Multiplication theorem of variance and co-variance.

Books Prescribed:

- 1 K.L. Chung: Elementary Probability Theory with Stochastic Processes, Springer International Student Edition, Ch.-2(2.1-2.4), Ch.-4 (4.1-4.5), Ch.-5 (5.1, 5.2, 5.5), Ch.-6 (6.1-6.3).

b. Differential Geometry:

50 Marks

Unit-III Theory of space curve: Equation to a curve. Arc length of a curve, Tangential vector. Osculating plane, Normal plane and Rectifying plane, Curvature and torsion and Frenet formulae, Formulae for curvature and torsion. Some theorems on curvature and torsion. Helices.

Unit-IV Osculating circle: Osculating sphere, spherical indicatrices involute and evolute, Bertrand curves, Co-ordinates in terms of arc-length, Intrinsic equation.

Unit-V Theory of surfaces: Introduction, Normal line and tangent plane, surface of revolution, characteristics, envelope and edge of regression. Developable surfaces, Fundamental differential form, Angle between two directions. Family of curves. Normal sections. Principal direction: Asymptotic direction, Conjugate directions and Geodesic.

Books Prescribed:

1. B.P. Acharya & R.N. Das: Fundamentals of Differential Geometry, Kalyani Publisher, New Delhi., Ch.-1 (1.0-1.17), Ch.-2 (2.0-2.12).

PAPER-VI

Full Marks – 100

Duration 3 hours

a. Complex Analysis:

50 Marks

Unit-I Complex Number, Complex plane, Complex Function, Limits and derivatives, Cauchy Riemann equation, Laplace equation, Harmonic Function, Logarithmic function, Analytic Function, Examples of Analytic Function.

Unit-II Complex Integration, Cauchy theorem, Cauchy Integral formula (without proof), Independence of Path Cauchy in equality, Liouville's theorem, Fundamental theorem of algebra, Power Series, Radius of convergence of power series.

Unit-III Taylor's series and Laurent series (without proof), Zeros and singularities, residues, Cauchy's residue theorem (without proof), Evaluation of real integral using residue theorem.

Book Prescribed:

1. Erwin Kreyszig: Advanced Engineering Mathematics, Wiley Eastern Pvt. Ltd., Ch.-12,13,14,15.

Reference Book:

1. S. Punnuswamy: Foundation of Complex Analysis, Narosa Publication House.
2. J.B. Conway: Functions of One Complex Variable, Springer International Student Edition.
3. L.V. Ahlfors: Complex Analysis, McGraw Hill Book Co., New York.
4. J H Mathews and R W Howell: Complex Analysis in Mathematics and Engineering, Narosa.

b. Partial Differential Equation:

50 Marks

Unit-IV Total differential equation, condition of integrability, methods of obtaining primitive, solution in inspection, homogeneous equations, partial differential equation of 1st order: classification of integrals and their geometrical interpretation. Formation of partial differential equation, Lagrange's method of solving linear 1st order equations. Charpit's method for 1st order non-linear equations, standard forms.

Unit-V Linear Partial differential equations with constant coefficients, Homogeneous linear equations, reducible non-homogeneous linear equations.

Prescribed Book:

1. J. Sinha Roy & S. Padhi: A course on Ordinary & Partial Differential Equations, Kalyani Publishers, New Delhi, Ch.-12 & 13.

Reference Book:

1. N.M. Kapoor: A text book on Differential Equation, Pitambar Publication House.

PAPER-VII

Full Marks – 100

Duration 3 hours

a. Mechanics

50 Marks

Unit-I Methods of Plane Static: Introductory notes, Equilibrium of a particle. Equilibrium of a system of particles. Work and potential energy, Application in Plane Statics: Mass centers & Centre of gravity, Friction, Flexible cable, Plane kinematics of a particle, Motion of a rigid body parallel to a fixed plane..

Unit-II Methods of plane dynamics. Motion of a particle. Motion of a system, Projectile with and without resistance. Moment of inertia Kinetic energy and angular momentum. Rigid body rotating about a fixed axis.

Books Prescribed:

1. J.L. Synge & B.A. Griffith: Principle of Mechanics, International Students Edition, Ch.-2 (2.1-2.4), Ch.-3(3.1,3.2, 3.4), Ch.-4(4.1, 4.2), Ch.-5(5.1, 5.2), Ch.-6 (6.1, 6.2), Ch.-7(7.1, 7.2).

b. Mathematical Methods

50 Marks

Unit-III Laplace Transformation: Laplace transform. Inverse transform, Linearity, Laplace transforms of derivatives and integrals.

Unit-IV Shifting of the s-axis, shifting in the t-axis, unit step function, Differentiation and integration of transforms, Convolution.

Unit-V Fourier Series & Integrals: Periodic functions. Trigonometric series. Fourier Series, Euler formulae, Functions having arbitrary period, Even & odd functions. Half-range expansion, Determination of Fourier coefficient without integration. Approximation by trigonometric polynomials. Square error, the Fourier integral. Fourier transform

Book Prescribed:

1. Erwin Kreyszig: Advanced Engineering Mathematics, Wiley Eastern Pvt. Ltd., Ch.-5 (5.1-5.5), Ch.-10(10.1-10.6, 10.8, 10.9,10.10)

References

2. Murray.R Spiegel Laplace Transforms (Schaum series) Tata Mc Graw Hill
3. L C Andrews B K Shivamoggi; Integral transform for Engineers, Prentice Hall of India
4. Murray.R Spiegel: Fourier analysis (Schaum series) Tata Mc Graw Hill

PAPER-VIII (ELECTIVE)

Full Marks – 100

Duration 3 hours

A student is required to take anyone of the following and each paper carrying 100 marks.

- a. Number Theory
- b. Graph Theory
- c. Operation Research

b. Number Theory:

Divisibility, Primes, Congruency, solution of congruency, Congruency of degree 1, the function ϕ (n). Number Theory from Algebraic view point, multiplicative groups, . Quadratic reciprocity: Quadratic residues, Jacobi symbols.

Functions of Number Theory: Greatest integer function, arithmetic function, Mobius inversion formula, the multiplication of arithmetic.

Some Diophantine Equations $ax + by = c$, positive solutions, other linear equations $x^4 + y^4 = Z^2$, sums of Four and Five squares Waring's Problem, Sum of fourth power.

Prescribed Book:

1. Ivan Niven and H.S. Zuckerman: An Introduction to Theory of Numbers, Wiley Eastern Pvt. Ltd., Ch.-1 (1.1-1.3), Ch.-2 (2.1-2.4, 2.10, 2.11), Ch.-3 (3.1-3.3), Ch.-4 (4.1-4.4), Ch.-5 (5.1-5.9).

c. Graph Theory:

Introduction, paths and circuits, Trees and fundamental circuits, Cut sets and cut vertices, Planar and dual graphs, Vector spaces of a graph.

Prescribed Book:

1. N. Deo, Graph Theory with Application to Engineering & Computer Science, PHI

Reference Book:

1. F. Harary: Graph Theory, Narosa Publication House.

d. Operation Research:

UNIT –I

Operation Research an overview, Linear Programming problem(Mathematical formulation, graphical solution),

UNIT-II

simplex method,

UNIT-III

Duality in Linear programming,

UNIT-IV
Transportation problem,
UNIT-V
Assignment problem

Prescribed Book:

2. KantiSwarup,P K Gupta and Man Mohan:Operation Research Sultan Chand and sons. Chapters.- 1,2,3,4,5,10 and 11.

Reference Books:

1. B.S. Goel & S.K. Mittal: Operation Research, Pragati Prakashani, Meerut.
2. S.D. Sharma: Operation Research, Kedar Nath, Ram Nath Co., Meerut
3. P.K. Gupta and D.S. Hirra: Operation Research, S. Chand & Co. Ltd.

4. K.V. Mittal: Optimization Methods in Operation Research and System Analysis, Willey Eastern Ltd. New Delhi.
5. T.N. Mallik: Linear Programming (Theory & Application), U.N. Dhar & Sons Pvt. Ltd., Calcutta.

Appendix- D

SOCIOLOGY (HONS.)

COURSE STRUCTURE :

FIRST UNIVERSITY EXAMINATION

Paper – I	Introduction to Sociology	100 Marks 3 hrs.
Paper – II	Society in India	100 Marks 3 hrs.

SECOND UNIVERSITY EXAMINATION

Paper – III	Social Problems	100 Marks 3 hrs.
Paper – IV	Kinship, Marriage and Family	100 Marks 3 hrs.
Paper – V	Social Research Methods	100 Marks 3 hrs.
Paper – VI	Tribal and Rural Societies in India	100 Marks 3 hrs.

FINAL UNIVERSITY EXAMINATION

Paper – VII	Major Sociological Thinkers	100 Marks 3 hrs.
Paper – VIII	Dissertation	100 Marks 3 hrs.

DETAILED COURSE :

FIRST UNIVERSITY EXAMINATION

Paper – I	Introduction to Sociology	100 Marks
	Same as Pass Paper-I (Introduction to Sociology)	
Paper – II	Society in India	100 Marks
	Same as Pass Paper-II (Society in India)	

SECOND UNIVERSITY EXAMINATION

Paper – III	Social Problems	100 Marks
	Same as Pass Paper-III (Social Problems)	
Paper – IV	Kinship, Marriage and Family	100 Marks
	Same as Pass Paper-IV (Kinship, Marriage and Family)	

Paper – V	Social Research Methods	100 Marks
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Unit – I : Scientific Study of Social Phenomena :

- (a) Scientific Method
- (b) Objectivity in Social Science
- (c) Application of Scientific Method to Social Phenomena : The Concept of Values
- (d) Major Steps in Social Research

- Unit – II :** Hypothesis :
- (a) Objectives
 - (b) Types
 - (c) Sources
 - (d) Role of Hypotheses

- Unit – III :** Tools of Data Collection :
- (a) Observation
 - (b) Questionnaire
 - (c) Interview
 - (d) Case Study

- Unit – IV :** Sampling
- (a) Objectives
 - (b) Types
 - (c) Criteria of a good sampling
 - (d) Advantages and Limitations

- Unit – V :** Measures of Central Tendencies :
- (a) Meaning and Objective
 - (b) Mean
 - (c) Median
 - (d) mode

Books Recommended :

1. Kothari, C.R. (1989) : Research Methodology : Methods and Techniques, Wiley Eastern, Bangalore.
2. Young, P.V. (1988) : Scientific Social Surveys and Research, Research, Prentice Hall, New Delhi.

3. Punch, Keith (1996) : Introduction to Social Research, Sage, London.
4. Bijaj * Gupta (1972) : Elements of Statistics, R. Chand & Co., New Delhi.
5. Bryman, Alen (1988) : Quality and Quantity in Social Research, Urwin Hyman, London.
6. Jayaram, N. (1989) : Sociology – Methods and Theory, Macmillan, Madras.
7. Srinivas, M.N. & Shah, A.M. (1979) : Fieldworker and the Field, Oxford, New Delhi.

Paper – VI Tribal and Rural Societies in India (Detailed syllabus same as the previous one)

Paper – VI Major Sociological Thinkers (Detailed syllabus same as the previous one)

Paper – VI Dissertation (Detailed syllabus same as the previous one)

SOCIOLOGY (Elective Course)

Paper – I Introduction to Sociology 100 Marks

(Detailed syllabus same as the previous one)

Paper – II Society in India 100 Marks

Same as Pass Paper-II (Society in India)

Appendix-E

**Revised Syllabus for PHILOSOPHY (PASS & Hons.)Courses
(To be effective from the academic session 2014-15)**

PHILOSOPHY (PASS)

COURSE STRUCTURE

FIRST UNIVERSITY EXAMINATION

PAPER-I: SYMBOLIC LOGIC 100 MARKS

PAPER-II: PHILOSOPHICAL ANALYSIS 100 MARKS

SECOND UNIVERSITY EXAMINATION

PAPER-III: INDIAN PHILOSOPHY 100 MARKS

PAPER-IV: MORAL PHILOSOPHY 100 MARKS

DETAILED COURSE

FIRST UNIVERSITY EXAMINATION

PAPER-I: SYMBOLIC LOGIC

Unit- I

Introduction: symbolic logic and classical logic, the use of symbols, logical form, inference and implication. The calculus of propositions: propositions and their relations, truth-functions, basic truth-tables of the propositional calculus, relation between truth-functions, further logical constants.

Unit-II

The calculus of propositions (contd.): the truth-table method of testing the validity of arguments, logical punctuation and the scope of constants, the construction and application of truth-tables, An indirect method of truth-table decision, the classification of propositions, reference formulae, decision procedure and normal forms, the total number of truth-functional expressions, derivation by substitution.

Unit- III

Elements of predicate calculus; some new forms of inference, singular propositions, further remarks on proper names and descriptions, relation between the propositional calculus and the predicate calculus, the particular quantifier: existence, analysis of some quantified propositions, the universal quantifier, and the interpretation of quantifiers as conjunctions and disjunctions, free and bound variables: constants, interpretation and satisfiable formulae, the classical syllogism.

Unit- IV

Extensions of the Class of Formulae, Formulae with more than one Quantifier, Two-termed Predicates, Satisfiability: Finite Domains, Two-termed Predicates: Infinite Domains, Logical Truth, Decision Procedures, Axiom Systems

Unit- V

The Syllogism and the Algebra of Classes, Classes and the relationships between them, The Boolean Algebra of Classes, Boolean Algebra of Classes and the Syllogism

Prescribed Book:

Basson and O'Connor, *Introduction to Symbolic Logic*

Reference Book;

Roy, Anup and K. Om N. Rao, *A concise Study of Symbolic Logic*

PAPER-II: PHILOSOPHICAL ANALYSIS

Unit I

Meaning and Definition: Word Meaning, Definition, Vagueness, Sentence Meaning

Unit II

Concept, Truth, Sources of Knowledge, What knowledge is

Unit III

Analytic Truth, Technical, Empirical and Logical Possibilities

Unit IV

Substance and Universals, Mind and Body

Unit V

Realism, Idealism and Phenomenalism

Prescribed Book:

Reference Book:

Wing, A. C., *Fundamental Questions of Philosophy*

SECOND UNIVERSITY EXAMINATION

Paper III: INDIAN PHILOSOPHY

Unit I

Carvak: Theory of Perception

Jainism: Syadavada, Anekantavada

Unit II

Nyaya: Anuman and Vyapti

Vaisesika: Padartha

Unit III

Buddhism: Four Noble Truths, Pratityasamutpada , Ksanabhangavada, Nairatmyavada, Nirvana

Unit IV

Samkhya: Satkaryavada, Purusa, Prakruti, Vibartanvada

UnitV

Vedanta: Shabda, Brahman and Atman

Prescribed Book:

Dutta, D.M and Chatterjee, S.C., *An Introduction to Indian Philosophy*

Reference Books:

Choudhury, Banabihari, Bharatiya Darshanara Ruparekha, (Odia Ttranslation of M. Hiriyana's Outline of Indian Philosophy), Publisher: A. K. Mishra, 2013

Dasgupta,S., *History of Indian Philosophy*

Dutta D.M., *Six Ways of Knowing*, Calcutta University Press

Hiriyanna, M., *Outlines of Indian Philosophy*

Kar, B., *The Philosophy of Lokayata*, MLBD, 2013

Mohanty, J. N., *Classical Indian Philosophy*, Rowman and Little Field, 1999 (Free download of soft copy of the book is available in the site: bookfi.org)

Nayak, G. C., *Bharatiya Darshan*

Radhakrishnan, S., *Indian Philosophy*, Vol.I and II.

Sharma, C.D., *A Critical Survey of Indian Philosophy*

Paper IV: MORAL PHILOSOPHY

Unit I

Definition, nature and scope of Ethics, Relation of Ethics to Politics, Sociology and Religion

Unit II

Moral and Non-moral action, Objects of moral judgment

Unit III

Moral Standards: Law, Hedonism (Bentham and Mill), Rigorism (Kant: Goodwill and Categorical Imperatives), Perfectionism

Unit IV

Theories of Punishment: Deterrent Theory, Preventive Theory and Reformative Theory

Unit V

Niskama karma of the Bhagavad Gita, Non-violence (Jainism, Buddhism and Gandhi)

Prescribed Book:

Sinha, J. N., Manual of Ethics

Reference Books:

Aristotle, *Nicomachean Ethics*

Baron, M.W., Petit, P and Slote, M, *Three Methods of Ethics*, Blackwell, 1997

Benn, Piers, *Ethics*, UCL, 1998

Frankena, W., *Ethics*, Prentice Hall, India

Hurshrone, R., *Virtue Ethics*

Lillie, W., *An Introduction to Ethics*

Mackenzie, J.N., *Manual of Ethics*

Rao, K. Om. N. And H. N. Behera, *An Introduction to Ethics*, Kalyani Publishers

Roy, Anup, *Niti Darshan*, Kalyani Publishers

Shaida, S.A., *Problems of Ethics*, Spectrum, Guwahati

PHILOSOPHY (HONOURS)

COURSE STRUCTURE

FIRST UNIVERSITY EXAMINATION

PAPER-I: SYMBOLIC LOGIC 100 MARKS

PAPER-II: PHILOSOPHICAL ANALYSIS 100 MARKS

SECOND UNIVERSITY EXAMINATION

PAPER-III: INDIAN PHILOSOPHY 100 MARKS

PAPER-IV: MORAL PHILOSOPHY 100 MARKS

PAPER-V: HISTORY OF WESTERN PHILOSOPHY 100 MARKS

PAPER-VI: PHILOSOPHY OF RELIGION 100 MARKS

FINAL UNIVERSITY EXAMINATION

PAPER-VII: CONTEMPORARY INDIAN PHILOSOPHY 100 MARKS

PAPER-VIII: POLITICAL PHILOSOPHY 100 MARKS

DETAILED COURSE

FIRST UNIVERSITY EXAMINATION

PAPER-I: SYMBOLIC LOGIC 100 MARKS

Same as Philosophy Pass Paper-I: Symbolic Logic

PAPER-II: PHILOSOPHICAL ANALYSIS 100 MARKS

Same as Philosophy Pass Paper-II: Philosophical Analysis

SECOND UNIVERSITY EXAMINATION

PAPER-III: INDIAN PHILOSOPHY 100 MARKS

Same as Philosophy Pass Paper-III: Indian Philosophy

PAPER-IV: MORAL PHILOSOPHY 100 MARKS

Same as Philosophy Pass Paper-IV: Moral Philosophy

PAPER-V: HISTORY OF WESTERN PHILOSOPHY 100 MARKS

Unit I

Plato: Theory of Ideas

Aristotle: Theory of Forms

Unit II

Bacon: Idola, Induction

Descartes: Method of doubt, Theory of God, Mind-body Relation

Unit III

Spinoza: Substance, Attributes and Modes

Leibnitz: Monads and Pre-established Harmony

Unit IV

Locke: Refutation of Innate Ideas and Theory of Knowledge

Berkeley: *Esse est percipi* and Subjective Idealism

Unit V

Hume: Theory of Knowledge, Theory of Cause and Theory of Soul

Kant: Theory of Knowledge, Space and Time

Prescribed Book:

Stace, W.T., *Critical History of Greek Philosophy*, Macmillan, 1972

Thilly Frank, *A History of Philosophy*, Henry Holt and Company, New York, 1955

Reference Books:

Chatterjee, Margaret, *Philosophical Inquiries*, MLBD

Cunningham, G. W., *Problems of Philosophy*

Ewing, A. C., *Fundamental Questions of Philosophy*

Falkenberg, R., *History of Modern Philosophy*

Hamlyn, I. W., *Metaphysics*

Hospers, J., *An Introduction to Philosophical Analysis*

Pati Ratnakar, *History of Western Philosophy*

Masih Y., *History of Western Philosophy*

Taylor, R., *Metaphysics*

PAPER-VI: PHILOSOPHY OF RELIGION 100 MARKS

Unit I

Nature of Philosophy of Religion

Judaic-Christian concept of God

Karma and Reincarnation

Unit II

Arguments for the Existence of God: The Ontological Argument, The First-Cause and Cosmological Arguments, The Design (or Teleological) Argument, The Moral Argument

Unit III

Arguments against the Existence of God: The Sociological Theory of Religion, The Freudian Theory of Religion, The Challenge of Modern Science

Unit IV

The Problem of Evil: The Problem, The Augustinian Theodicy, The Irenaean Theodicy, Process Theodicy

Unit V

The problems of Religious Language: The peculiarity of Religious Language, The Doctrine of Analogy, Religious Statements as Symbolic (Tillich), Religious Language as Non-cognitive, Braithwaite's Non-cognitive Theory, The Language-Game Theory

Prescribed Book:

Hick, J., *Philosophy of Religion*, Prentice Hall

Reference Books:

Hick, J. (ed.), *Classical and Contemporary Readings*

Hick, J., *An Interpretation of Religion*

Masih, Y., *Religious Philosophy*

Mohapatra, A. R., *Philosophy of Religion*

Nayak, G. C., *Evil, Karma and Reincarnation*

FINAL UNIVERSITY EXAMINATION

PAPER-VII: CONTEMPORARY INDIAN PHILOSOPHY 100 MARKS

Unit I

Swami Vivekananda: Concept of Man, Universal Religion

Sri Aurobindo: Concept of Ultimate Reality, Evolution of Consciousness

Unit II

S. Radhakrishnan: Intellect and Intuition, Reality and Religion

R. Tagore: Humanism, Problem of Evil

Unit-III

J. Krishnamurthy: Tradition, Freedom and Education.

M. K. Gandhi: Tradition, Freedom and Education

Prescribed Books:

Lal, B.K, *Contemporary Indian Philosophy*, MLBD

Krishnamurthy, J: *Freedom from the Known*

Reference Books:

Datta, D. M., *Chief currents in Contemporary Philosophy*

Hee, Peter (Ed.), *Basic Writings of Sri Aurobindo*, Oxford

Iyer, M. Raghavan, *Moral and Political Thought of Mahatma Gandhi*, OUP

Mohanty J.N., *Explorations in Indian Philosophy*, OUP

Maitra, S.K., *The Philosophy of Sri Aurobindo*, Aurobindo Ashram

Radhakrishnan, S., *An Idealist view of Life*, George Allen and Unwin, 1971

Rao, P. Nagaraj, *Contemporary Indian Philosophy*

Rippe, Dale, *Indian Philosophy since Independence*

Srivastab, Ramsankar, *Contemporary Indian Philosophy*

Vivekananda, Swami, (Selections from *The Complete Works of Swami Vivekananda*)

PAPER-VIII: POLITICAL PHILOSOPHY 100 MARKS

Unit I

Plato: Theory of Justice, Communism of Property

Aristotle: Concept of Citizenship, Concept of Justice

Unit II

Nature of Political Thought

Machiavelli: Separation between Politics and Ethics

Hobbes: Human Nature, Origin and Nature of Sovereignty

Unit III

Locke: Concept of Social Contract, Right to Property

Rousseau: Social Contract and the General Will

Unit IV

Mill: Defense of Liberty, Democracy

Rawls: Theory of Justice

Unit V

Hegel: Philosophy of History, Individual's Quest for Freedom

Marx: Dialectical Materialism, Theory of Revolution

Prescribed Book:

Gauba, O. P., *Western Political Thought*, Macmillan, 2013

Reference Book:

Barker, E., *Greek Political Theory*

Barker E., *Principles of Social and Political Philosophy*

Raphael, D. D., *Problem of Political Philosophy*

Roy, Krishna and Chhanda Gupta, *Essays in social and Political Philosophy*, Allied Publishers

Sabine, G. M., *A History of Political Theory*, Surjeet Publications

Sinha, J. N., *Outlines of Political Philosophy*

Wayper, C. L., *Political thought*

Appendix- F

Changes in +3 Science English (Compulsory) course

(be effective from the academic session 2014-15.

First University Examination

Chudamani Raghavan's **Yamini** to be replaced by A Tapestry of short stories edited by Dr. Nanda Kishore Mishra and Dr. Sisir K. Swain (Authors Press, Delhi: 2009) in addition, writing an expansion and a précis be taught.

Division of marks

The short answer type (50 words) questions of 5 marks each and one essay type question of 15 marks on the short stories. 10 marks for an expansion and 15 marks for the précis (within 150 words)

Piece to be taught from A Tapestry of short stories:-

1. Boless by maxim Gorki
2. The long exile by count les Nikolayevich Tolstoy
3. The submerged valley by Manoj Das
4. Revenge by Guy de Maupassant
5. The cop and the Anthem by O Henry
6. A cup of Tea by Katherine Mansfield

Appendix- G

**Changes in +3 Commerce Communicative English course
(be effective from the academic session 2014-15.)**

+ 3 Commerce Communicative English

1. (b) Writing of Texts Larger than Paragraph
“Learning to follow..... proof reading at connection” be related.
Remapping, Orient Black swan, 2013 for writing skills be included in Books
Recommended