Admission Brochure for PhD Admission Test: First Semester 2018-19

INDEX

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Programmes offered</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Eligibility Criteria for Admissions &amp; Some Important dates and deadlines</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Test Details</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Syllabus for Test</td>
<td>5</td>
</tr>
</tbody>
</table>
Programmes offered

Applications are invited for admission to PhD programme at Pilani, Goa and Hyderabad campuses under 'Full Time' and 'Part Time' scheme in following Departments during First Semester 2018-19

<table>
<thead>
<tr>
<th>Departments</th>
<th>BITS Pilani campus at</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pilani</td>
<td>Goa</td>
<td>Hyderabad</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full Time</td>
<td>Part Time</td>
<td>Full Time</td>
<td>Part Time</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Chemical Engg.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Civil</td>
<td>Yes</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>CSIS</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>EEE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Humanities &amp; Social Sciences</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Economics &amp; Finance</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Management</td>
<td>Yes</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>Yes</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Physics</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Yes- A department does intend to admit student under specific scheme
*No/NA- A department does not intend to admit student under specific scheme

Candidates are requested to visit the web page of respective department, or contact HoD, for further details.
Eligibility Criteria for Admissions

Any Higher Degree such as M.E./M.Pharm./MBA/M.Phil of BITS or its equivalent with a minimum of 60% aggregate in the qualifying examination. Candidates with an M.Sc./B.E./B.Pharm or an equivalent degree with a minimum of 60% aggregate may also be considered for Ph.D. admission subject to their suitability and competence. For Ph.D. Programme in Humanities and Social Sciences, candidates with an M.A. and with minimum of 55% aggregate may also be considered. Shortlisted candidates will be called for a written test/interview for selections.

**Full time students:** Candidates are required to devote their full time towards Ph.D. Short listed candidates will be required to come to designated campuses at Pilani / Goa / Hyderabad, for test and/or interview.

**Part time students:** Preferably individuals working in organizations providing basic facilities and environment for research to be admitted under this scheme.

**Assistantship:** Rs 25,000 per month: Institute Research Assistantship for 1st Year Full time PhD students. Higher Assistantship is paid in subsequent years. Students selected in sponsored research projects, will get the stipend according to the rule of funding agency.

Selected candidates will be required to participate in teaching and other academic programme of the institute under the guidance of a mentor.

### Some Important Dates

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last date for completed application form to reach admission office</td>
<td>16/5/2018 (5.00 PM)</td>
</tr>
<tr>
<td>Declaration of shortlist to candidates (through BITS website)</td>
<td>2/6/2018</td>
</tr>
<tr>
<td>Test / Interviews:</td>
<td>20/7/2018</td>
</tr>
<tr>
<td>Announcement of admission offers to PhD Programmes</td>
<td>23/7/2018</td>
</tr>
<tr>
<td>Admission of Selected students</td>
<td>30/7/2018</td>
</tr>
<tr>
<td>Freshmen Orientation Programme</td>
<td>30-31, July 2018</td>
</tr>
<tr>
<td>Registration</td>
<td>8/8/2018</td>
</tr>
</tbody>
</table>
TEST DETAILS

(I) Candidates shortlisted for Test in any of the following disciplines: Biological Science/Chemistry/Mathematics/Physics will have to write two tests. Test-I will be common to all disciplines and Test-II will be discipline specific. The details of the tests are as follows:

Test-I question paper consists of 30 multiple-choice type questions pertaining to General Science, Quantitative Reasoning & Analysis and Research Aptitude. The candidate is required to answer all the questions in allotted 1 hr time. Each correct answer will be awarded two marks. 0.5 marks will be deducted for every wrong answer.

Test-II will be subject-based and will consist of 70 multiple-choice type questions covering the prescribed syllabus as given below. The candidate is required to answer all the questions in allotted 2 hr time. Each correct answer will be awarded two marks. 0.5 marks will be deducted for every wrong answer.

(II) Candidates shortlisted for Test in any of the following disciplines: Languages/Humanistic Studies/Economics will have to write two tests. Test-I will be common to all disciplines and Test-II will be discipline specific. The details of the tests are as follows:

Test-I will comprise of the following components:

1. Reading Comprehension: 2 Passages (5Qs each=10 Qs) 20 mts
2. Logical Reasoning 10 question 10 mts
3. Analytical Reasoning 15 question 15 mts
4. General Awareness 10 question 15 mts

50 Qs. 60 mts

Test-II will be discipline specific (60 questions)

(III) Candidates shortlisted for Test in Pharmacy: The Pharmacy test would be a 2 Hours test consisting of two parts. Part-A would be common to all and would consist of questions in general Pharmacy subjects and Part-B will be based on subject taken by students in their MPharm Degree Program.

(IV) Candidates appearing for interview for Ph.D. program in the Department of Management will be required to take a written case analysis (Duration: 1 hour)

(V) Candidates appearing for interview for Ph.D. program in the Department of CSIS with highest degree as BE will be required to take a 2 hours objective type written test.

(VI) Candidates appearing for interview for Ph.D. program in the Department of Chemical Engineering with highest degree as BE will be required to take a 2 hours objective type written test.

Based on the tests there may be shortlisting of candidates for Interview

All notices/shortlists will be put on admission website www.bitsadmission.com. Candidates are advised to check this website regularly. No written communication will be sent to candidates.
Syllabus for Test

Biological Sciences

<table>
<thead>
<tr>
<th>Topic</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Technique:</td>
<td>Restriction endonucleases, Vectors and cloning, Blotting technique, PCR, Sequencing</td>
</tr>
<tr>
<td>Biological Chemistry:</td>
<td>Chemistry of Biomolecules, Enzymes, Vitamins &amp; Coenzymes, Bioenergetics and biological oxidation, Metabolism of Biomolecules, Photosynthesis</td>
</tr>
<tr>
<td>Microbiology:</td>
<td>Fundamentals of Microbiology, A survey of the microbial world, Host-Microbe interaction, Microbes and Human disease, Environmental and applied microbiology</td>
</tr>
<tr>
<td>Ecology:</td>
<td>Abiotic factors, Ecosystem ecology and energy flow, Community ecology and population ecology, Regional Ecology (Terrestrial and Aquatic), Regional Ecology (Terrestrial and Aquatic)</td>
</tr>
<tr>
<td>Reference books:</td>
<td>Concepts of Ecology by E J Kormondy</td>
</tr>
<tr>
<td>Plant Physiology:</td>
<td>Transport and translocation of water and solutes, Essential elements and their function, Plant development and PGRs, Ascent of sap and translocation in phloem, Movement in plants</td>
</tr>
<tr>
<td>Reference books:</td>
<td>Plant physiology, 3rd edition by Salisbury &amp; Ross- CBS Publisher and Distributor.</td>
</tr>
<tr>
<td>Biophysics:</td>
<td>Chemical properties of basic unit of life, energy forces, bonds., Conformation of Biomolecules, Biological membranes and Biomechaniques, Physiochemical techniques to study biomolecules, X-ray crystallography, NMR, molecular modeling.</td>
</tr>
<tr>
<td>Reference books:</td>
<td>Biophysical chemistry by Cantor and Schimmel.</td>
</tr>
<tr>
<td>Developmental Biology:</td>
<td>Model systems-Vertebrates, Invertebrates and Plants, Axis and germ layers, The mesoderm and early nervous system, Morphogenesis and cell differentiation, Organogenesis, germ cells and sex.</td>
</tr>
<tr>
<td>Cell Biology:</td>
<td>Preview of cell, cellular membranous systems, Transport, Mitochondria, Chloroplast, energy transducing organelle, Golgi, Nucleus, Cytoskeletal network, Cell growth &amp; proliferation, Cell Immunity</td>
</tr>
<tr>
<td>Animal physiology:</td>
<td>Digestive and Respiratory system, Circulatory system, Excretory system, Nervous and Endocrine system, Body Immune system</td>
</tr>
</tbody>
</table>
Chemistry

Physical Chemistry:
Basic principles and applications of quantum mechanics, angular momentum, hydrogen atom, atomic structure, chemical bonding, variational and perturbational methods, pure rotational spectroscopy, vibrational spectroscopy, vibrational-rotational spectroscopy, Raman spectroscopy, electronic spectroscopy, nuclear magnetic resonance spectroscopy, electron spin resonance spectroscopy, mass spectroscopy, fluorescence spectroscopy
Concepts and laws of thermodynamics, entropy, free energy, calculation of changes in thermodynamic properties, partial molar properties, ideal and real gases, ideal and non-ideal solutions, electrolytic solutions, colligative properties, phase equilibria, chemical equilibria, electrochemistry and applications, kinetic theory of gases, statistical thermodynamics
Chemical kinetics, rate laws, order and molecularity, determination of reaction mechanism, Arrhenius equation, theory of reaction rates, concept of catalysts, elementary reactions, consecutive elementary reactions, unimolecular reactions, polymerization kinetics, photochemical processes, quantum yield, enzyme kinetics, thermodynamic and kinetic control, physisorption and chemisorption, molecular interactions, self-assembly and transport processes

Reference books:
7. Donald A. McQuarrie & J. D. Simon, ‘Molecular Thermodynamics’, Viva Book Pvt Ltd., New Delhi, 2004

Inorganic Chemistry:
Character Table and its Applications in Infrared and Raman spectroscopy and in Bonding; Coordination Chemistry: Bonding - Valence Bond, Crystal Field, and Molecular Orbital theories; Complexes - Nomenclature, Isomerism, Coordination Numbers, Structure, Electronic Spectra, Magnetic Properties, Chelate Effect; Reactions - Nucleophilic Substitution Reactions, Kinetics, Mechanisms; Organometallic Chemistry: Structure and Reaction of Metal Carbonyls, Nitrosyls, Dinitrogen, Alkyls, Carbenes, Carbynes, Carbides, Alkenes, Alkynes, and Metalloenes; Catalysis by Organometallic Compounds; Stereochemically Non-Rigid Molecules.
Bio-inorganic chemistry; metalloenzymes; metalloproteins; role of alkali and alkaline earth metal ions, iron, copper, zinc, molybdenum etc. in life processes; Basic concepts in electronic, magnetic and photonic materials and nanomaterials.

Reference books:

Organic Chemistry:
Structure and Reactivity of Organic Compounds: IUPAC nomenclature of organic compounds, Reactive intermediates (carbocations, carbanions, free radicals, carbenes, benzynes and nitrenes), Aromaticity (Benzenoid and non-benzenoid compounds), Aliphatic & Aromatic Nucleophilic and Electrophilic Substitutions, Addition Reactions (carbon-carbon and carbon-hetero-multiple bonds) Elimination Reactions, Neighboring Group Participation
Chemistry of Organic Compounds: Chemistry of functional groups, Structure, property and reactions of five and six membered heterocyclic (O, N and S) compounds, Organometallic compounds in organic synthesis, Natural products (carbohydrates, alkaloids, terpenes, amino acids).
Sterechemistry of Organic Compounds: Stereochemistry (isomerism, chirality, origin of optical activity, stereochemistry of cyclic compounds, resolution), Selectivity (chemo-, regio-, and stereoselectivity), Conformations and configurational analysis of acyclic and cyclic compounds, Resolution and other asymmetric induction methods, Name reactions and rearrangements.
Retrosynthetic Analysis: Disconnection approaches, Protecting Groups, Umpolung of reactivity, Ring synthesis and synthesis of Heterocyclic compounds
Pericyclic Reactions and Photochemistry: Orbital symmetry, Electrocyclisation, Cycloaddition, Sigmatropic rearrangements and other related concerted reactions, Principles and applications of photochemical reactions in organic chemistry
Spectroscopy of Organic Compounds: Structural elucidation of organic compounds using UV, IR, NMR (1H & 13C), Mass Spectrometry

Reference books:
### Analytical Chemistry:

- Instrumental methods of analysis: Magnetic Resonance Spectroscopy ($^1$H NMR, $^{13}$C NMR, EPR), IR Spectroscopy, Mass Spectrometry, Ultraviolet and visible spectroscopy, fluorescence spectroscopy, chromatography and other separation techniques, Structure Resolution by combination of techniques.
- Chemical experimentation: Chemical Experimentation: Functional group identification and synthesis of organic compounds, Chromatography techniques (TLC & HPLC), Separation and qualitative analysis of mixture of organic Compounds.
- Acid base titrations, Complexometric titrations, Study of kinetics of chemical reactions, Determination of partition function, Adsorption isotherm, Synthesis and characterization of nanomaterials

### Reference books:
- Vogel’s textbook of practical organic chemistry 5th edition

### Economics

#### Principles of Economics:
- Demand, Supply, Elasticity, Consumer Behavior, Analysis of Production and Cost Analysis, Markets, Basics of Macroeconomics, Economics of Public Goods

**Reference books:**
- Lipsey R G & Chrystal K A. Economics OUP, 10th ed. 2004

#### Fundamentals of Finance & Accounting:
- Basics of Accounting, Financial Statements and Analysis, Introduction to Securities, markets and analysis, Banking System, RBI, Non-bank financial intermediaries, Markets for Future, Options & Derivatives; Foreign Exchange Markets

**Reference books:**
- Horngren, Sundem, and Elliott, Introduction to Financial Accounting, Pearson Education India Ltd. 8th ed. 2004

#### Microeconomics:

**Reference books:**

#### Macroeconomics:

**Reference books:**

#### Econometrics:
- Basics of Statistics, OLS, k-variable Linear Equation, General Linear Model, Violation of classical Assumptions, Heteroscedasticity, Autocorrelation, Multi co linearity, ARIMA Model, Time Series Analysis, Simultaneous Equation System

**Reference books:**

#### Money Banking & Financial Markets:

**Reference books:**

#### Public Finance – Theory and Practice:

**Reference books:**
## Economics of Growth and Planning:


**Reference books:**
- Devraj Ray Development Economics OUP, Delhi 1998

## International Trade and Balance of Payments:

International Economics, Trade, International Trade – Comparative Advantage, Heckscher –Ohlin (H-O) Model, Modern Theories of International Trade, Tariffs, Quotas, FDI, BOP, GATT, WTO, International Monetary System

**Reference books:**
- Salvatore D. International Economics WSE 8th ed. 2004

## Issues in Indian Economy:

India’s Economic Growth & Development, Significant Aspects of Indian Economy – Agriculture, Infrastructure, Private & Public Sector, Industrial Growth, Import- Export, Unemployment, Commercial Banking & Finance, Inflation& Income Growth, Money Supply, Monetary Control, India’s Trade, External Aid, Public Debt

**Reference books:**

## Mathematics

### Algebra


**Reference books:**
- Topics in Algebra by I.N. Herstein, Vikas Publishing House Pvt Ltd.

### Analysis


**Reference books:**
- Measure Theory and Integration by G. D. Barra, Willey Eastern.

### Topology

Topological spaces; special topologies, subspaces, product spaces and quotient spaces, continuity and homeomorphisms, connectedness and compactness, fundamental groups of surfaces.

**Reference books:**
- Topology by J.R. Munkres, Pearson Education publication.
- Introduction to Topology and Modern Analysis by G.F. Simmons, Mc-graw hill Publishers.

### Ordinary Differential Equations (ODEs)

Existence and uniqueness of solutions of initial value problems for first order ODEs, singular solutions of first order ODEs, system of first order ODEs. General theory of homogeneous and non-homogeneous linear ODEs, variation of parameters, Strum-Liouville boundary value problems, Green’s function.

**Reference books:**
- Differential Equations by G.F. Simmons.

### Partial Differential Equations (PDEs)

Lagrange and Charpit’s methods for solving first order PDEs, Cauchy problem for first order PDEs. Classification of second order PDEs, general solution of higher order PDEs with constant coefficients, method of separation of variables for Laplace, Heat and Wave equations.

**Reference books:**
- Elements of Partial Differential Equations by I.N. Sneddon, Mc-graw hill Publisher.

### Linear Algebra

Vector spaces, subspaces, linear dependence, basis, dimension, algebra of linear transformations. Algebra of...

Reference books: Linear Algebra by K. Hoffmenn and R. Kunze, Prentice hall of India Pvt Ltd.
Linear algebra and matrix theory by J. Gilbert and L. Gilbert, Brooks Cole.
Introduction to linear algebra by G. Strang Wellesley Cabridge Press.

Complex Analysis

Algebra of complex numbers, the complex plane, polynomials, power series, transcendental functions such as exponential, trigonometric and hyperbolic functions. Analytic functions, Cauchy-Riemann equations. Contour integral, Cauchy’s theorem, Cauchy’s integral formula, Liouville’s theorem, maximum modulus principle, Schwarz lemma, open mapping theorem. Taylor’s series, Laurent’s series, calculus of residues. Conformal mappings, Mobius transformations.

Reference books: Complex Variables and Applications by James Brown, R. V Churchill.

Numerical Analysis


Functional Analysis

Normed linear spaces, Riesz lemma, Banach spaces, normed linear spaces, continuous linear transformations on normed linear spaces, inner product spaces, Hilbert spaces, orthogonal sets, direct sum, Bessel’s inequality, Riesz representation theorem, uniform boundedness principle, open mapping theorem, closed graph theorem.

Introductory Functional Analysis with Applications by Erwin Kreyszig.

Probability

Sample space, discrete probability, independent events, Bayes’ theorem. Random variables and distribution functions (univariate and multivariate); expectation and moments. Independent random variables, marginal and conditional distributions. Characteristic functions. Probability inequalities (Tchebycheff, Markov, Jensen). Modes of convergence, weak and strong laws of large numbers, central limit theorems (i.i.d. case).


Optimization

Modeling with linear programming, general L.P. solution, The simplex method, duality and post optimal analysis, transportation model and its variants, goal programming and integer linear programming, non linear programming algorithms.


Operations Research

Queueing systems: Poisson queueing systems, Reliability: reliability and hazard rate function of series and parallel systems, inventory systems: single item inventory models, simulation and game theory, network models and deterministic dynamic programming.


Advanced Calculus

Functions of several variables, directional derivative, partial derivative, and derivative as a linear transformation, inverse and implicit function theorems.


Physics

Modern Physics

### Reference books:

### Thermodynamics & Properties of Matter

### Reference books:

### Classical Mechanics
- Constraints, Generalized Coordinates, De-Alembert’s principle, Lagranges Equations of Motion, Two-body Central force motion, Rigid Body Kinematics, Rigid Body Dynamics, Hamilton’s Equations of Motion

### Reference books:

### Electromagnetic Theory

### Reference books:

### Quantum Mechanics

### Reference books:

### Methods of Mathematical Physics
- Vector Analysis, Curvilinear Coordinates, Matrices and Vector Spaces, Functions of Complex Variables, Ordinary Differential Equations, Sturm-Liouville Theory and Special Functions, Elements of Partial Differential Equations

### Reference books:

### Statistical Physics
- Elements of Probability Theory, Elementary Kinetic Theory, Microcanonical, Canonical & Grand Canonical Ensembles and Their Applications, Quantum Statistics of Ideal Bose Gases, Quantum Statistics of Ideal Fermi Gases

### Reference books:

### Solid State Physics

### Reference books:

### Optics & Spectroscopy
- Geometrical Optics, Interference, Diffraction, Polarization, Optical Optics & Lasers, Atomic & Molecular Spectroscopy

### Reference books:

### Nuclear & Particle Physics
- Nuclear Properties and Nuclear Models, Fission & Fusion, The Quark Model, Elementary Particles, their Classification and Interactions, Particle Accelerators, Conservation Laws of Elementary Particles and Fundamental Interactions

### Reference books:
Computer Science

The Computer Science test will be based on the following subject:

1. Data structures and Algorithms
2. Operating Systems
3. Computer Organization & Architecture
4. Database systems
5. Software engineering

Chemical Engineering


Reference books:
**Fluid Flow Operations**


**Reference books:**

**Chemical Engineering Thermodynamics**

First & Second Laws, PVT behavior & Heat Effects, Properties of pure fluids and thermodynamics of flow processes, Solution thermodynamics, VLE and chemical reaction equilibrium.

**Reference books:**

**Mass Transfer Operations**

Molecular diffusion and mass transfer coefficients, Interphase mass transfer, Gas absorption, Distillation, Liquid extraction and leaching.

**Reference books:**

**Heat Transfer Operations**

Steady and Unsteady state heat conduction, Natural & Forced convection, Radiation, Condensation, boiling and evaporation, Heat Exchangers.

**Reference books:**

**Selected Chemical Engineering Operations**


**Reference books:**

**Kinetics & Reactor Design**

Mole balances and reactor sizing, Rate laws and stoichiometry, Isothermal reactor design for single and multiple reactions, Analysis of laboratory reactor data, and reaction mechanisms for nonelementary reactions, Non isothermal reactor design for single and multiple reactions, Heterogeneous reactors, Data analysis & design, Non Ideal reactors.

**Reference books:**

**Chemical Process Technology**

Process synthesis concepts for flow sheet generation; species allocation; separation task sequence and task integration, Technologies related to Inorganic Chemical Industries, Technologies related to Natural Product Industries, Technologies related to synthetic organic chemical industries, Technologies related to Polymerization industries.

**Reference books:**

**Process Design Decisions**

Engineering Economics; Economic Decision Making, Input Information and Batch versus Continuous; Input-Output Structure; Recycle Structure; Separation System, Heat Exchanger Networks (Energy Integration), Cost Diagrams; Preliminary Process Optimization; Process Retrofits.

**Reference books:**

**Process Control**

Dynamic modeling and simulation of momentum, energy, mass transfer and reacting systems, Analysis of the dynamic behavior of chemical processes, Analysis and design of simple feedback and advanced control systems, Design of control systems with multiple input and multiple output, Digital sampling, filtering and control.
<table>
<thead>
<tr>
<th>Reference books:</th>
</tr>
</thead>
</table>

### Humanities & Social Sciences:

#### Media Studies:
Cinematic Art, Cinematic Adaptation, Understanding News, Current Affairs, Mass communication, Advertising, Media Writing, Content Design, Short Film Making

**Reference books:**

#### Communication:
Business Communication, Conflict Management, Technical Communication

**Reference books:**
- The Dynamics of Conflict Resolution, San Francisco: Wiley Company, 2000

#### Phonetics, Language & Literature:
English Language Teaching, English Usage, Phonetics and Language, English Literature: Elizabethans and Augustan, Pre-romantics and Romantics, Victorian Literature, Twentieth Century Literature: Poetry and Drama, Twentieth Century Literature: Prose and Fiction, Indian Writing in English, Applied Linguistics, American Literature, Women’s Writing, Postcolonial Literature

**Reference books:**
- The Oxford Companion To English Literature.
- Studying English Literature (A Practical Guide) by Tory Young.

#### Music:
Logic and science working behind music, Schools of musical training, Musical forms and styles

**Reference book:**
- SangeetRatnakar by Sharangdev

#### Other HSS areas:
Test can also be conducted in these subjects depending upon the applications:
- Sociology, Public Policy, Gender Studies, History, Psychology, Philosophy, Political Science, Professional Ethics, Education

### Digital Humanities:

**Reference books:**

### Philosophy

**Reference books:**
- The Essentials of Indian Philosophy, M. Hiriyanna, 2015, Motilal Banarsidass Publishers

### General Psychology

**Reference books:**
- Robert A Baron, Psychology, Prentice Hall of India, 2005
<table>
<thead>
<tr>
<th>Cognitive Psychology</th>
<th>Reference books:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Educational Psychology</th>
<th>Reference books:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Education</th>
<th>Reference books:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Organizational Behavior</th>
<th>Reference books:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Robins, Stephen; Judge, Thimonthy A; and Sanghi, Sooma. 2010. Essentials of Organizational Behavior. Pearson Education India</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spiritual Intelligence</th>
<th>Reference books:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zohar and Marshall, Spiritual Intelligence The Ultimate Intelligence, Bloomsbury, 2001.</td>
</tr>
<tr>
<td></td>
<td>Schuller, Peter A., Spiritual Intelligence, Author House, 2003.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Political Science</th>
<th>Reference books:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Development Economics</th>
<th>Reference books:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Introduction to Development Studies</th>
<th>Reference books:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>International Relations</th>
<th>Reference books:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><a href="https://fadukyppyz.files.wordpress.com/.../the-globalization-of-world-pol">https://fadukyppyz.files.wordpress.com/.../the-globalization-of-world-pol</a>...</td>
</tr>
<tr>
<td></td>
<td><a href="https://peaceandconflictstudiesblog.files.wordpress.com/.../the-globalizati">https://peaceandconflictstudiesblog.files.wordpress.com/.../the-globalizati</a>...</td>
</tr>
<tr>
<td></td>
<td>Students are also expected to be familiar with NCERT’s Contemporary World Politics - <a href="http://www.ncert.nic.in/ncerts/textbook/textbook.htm?leps1=0-9">http://www.ncert.nic.in/ncerts/textbook/textbook.htm?leps1=0-9</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ecocriticism</th>
<th>Reference books:</th>
</tr>
</thead>
</table>