

ADMISSION TO FIRST YEAR (SECOND) SEMESTER* OF UG PROGRAMME FOR THE SESSION 2015-16:

The University shall admit students to the second semester of UG programme in January 2016 subject to vacancies that exist in the first semester of first year. The students admitted in this category shall have to clear all the courses as per the scheme of the discipline of Thapar University, in which she/he is admitted. Students shall have to schedule their remaining courses in the subsequent summer semesters and regular semesters with the permission of DoAA.

The eligibility & schedule of the admission will be as under:

Eligibility for BE/BTech programs other than BTech (Biotechnology):

1. She/he should be a student of BE/BTech programme of a recognised Institute/University and have passed 10+2 or equivalent examination from recognized board and have secured at least 70% (65% for SC/ST candidates) marks in aggregate of Mathematics, Physics and Chemistry/Computer science/Biology/Biotechnology.
2. She/he has qualified TU entrance test with at least 20% aggregate marks (15% for SC/ST candidates).
3. She/he should be a citizen of India.
4. She/he should bear a good character and satisfy the prescribed requirements of the University.
5. She/he is born on or after October 1, 1990 (5 years relaxation in age for SC/ST/PH candidates).

Eligibility for BTech (Biotechnology):

ELIGIBILITY:

A candidate shall be eligible for admission in the BTech (Biotechnology) subject to the following conditions:

The candidate

- (i) has passed 10+2 or equivalent examination with at least 70% marks (65% for SC/ST candidates) in aggregate of three subjects, namely, **Physics, Chemistry and, Biology.**
- (ii) has appeared in TU with at least 20% aggregate marks (15% for SC/ST candidates).
- (iii) possesses a good moral character.
- (iv) is a citizen of India.
- (v) is born on or after October 1, 1990 (5 years relaxation in age for SC/ST/PH candidates).

Schedule of the admissions:

Last date of receipt of application forms	December 1, 2015
Offline Entrance Test	December 20, 2015
Declaration of the merit list	January 4, 2016
Counseling for admission & deposit of fee	January 8, 2016
Commencement of classes	January 11, 2016

Venue for Offline Entrance Test: Patiala and New Delhi

Timing for Offline Entrance Test: 10:00 AM – 01:00 PM

Venue for counselling: Thapar University, Patiala.

Note: 1) No separate letter for Counselling shall be issued.

2) University reserves the right to make these admissions.

VACANT SEATS STATUS**BE-MBA INTEGRATED**

CIVIL ENGINEERING	06
COMPUTER ENGINEERING	0
ELECTRICAL ENGINEERING	20
ELECTRONICS & COMMUNICATION ENGINEERING	11
MECHANICAL ENGINEERING	0
Total	37

INTERNATIONAL ENGINEERING PROGRAM

CIVIL ENGINEERING	15
COMPUTER ENGINEERING	0
MECHANICAL ENGINEERING	0
ELECTRONICS & COMMUNICATION ENGINEERING	05
TOTAL	20

BE/BTECH 4 YEAR PROGRAM

STREAMS/BRANCHES	GEN	SC	ST	PH	TOTAL
BIOCHEMICAL ENGINEERING	13	04	02	01	20
CHEMICAL ENGINEERING	04	01	0	0	05
CIVIL ENGINEERING	0	0	0	0	0
COMPUTER ENGINEERING	07	02	01	01	11
COMPUTER ENGINEERING (HONOURS IN COMPUTER ANIMATION AND GAMING)	0	0	0	0	0
COMPUTER ENGINEERING (HONOURS IN MACHINE LEARNING AND DATA ANALYTICS)	04	01	0	0	05
ELECTRICAL ENGINEERING	0	0	0	0	0
ELECTRONICS & COMMUNICATION ENGINEERING	0	0	0	0	0
ELECTRONICS AND COMPUTER ENGINEERING	0	0	0	0	0
ELECTRONICS (INSTRUMENTATION & CONTROL) ENGG.	02	0	0	0	02
MECHANICAL ENGINEERING	0	0	0	0	0
MECHANICAL ENGINEERING (PRODUCTION)	0	0	0	0	0
MECHATRONICS	0	0	0	0	0
METALLURGICAL AND MATERIALS ENGINEERING	13	04	02	01	20
SOFTWARE ENGINEERING & MANAGEMENT	01	0	0	0	01
TOTAL	44	12	05	03	64

B.TECH. (BIOTECHNOLOGY) PROGRAM

STREAMS/BRANCHES	GEN	SC	ST	PH	TOTAL
BIOTECHNOLOGY	09	02	01	01	13
TOTAL	09	02	01	01	13

Note:

- In case of any seat(s) remaining vacant in the International Engineering Program or in the integrated program, the same shall be filled in the respective discipline of UG (4-year program).
- In case of any seat(s) left vacant in SC/ST/PH categories, the same shall be converted and filled in GEN category.

Admission Procedure:

- Only those candidates shall be considered who shall apply on the prescribed application form on or before the last date.
- The admission shall be made on the basis of merit of entrance test to be conducted by Thapar University.
- Candidate is required to pay tuition fee and other dues at the time of admission.
- There will be only one counselling.
- Candidate leaving after taking admission shall be refunded Caution Money and alumni fee only.
- The number of seats available for admission shall be available on our website www.thapar.edu. 15% seats shall be reserved for SC, 7.5% seats for ST category and 3% for physically handicapped category. In case, any seat in reserved category remains vacant, the same shall be converted to the General Category.
- Candidate should bring all the documents in original at the time of Counselling.
- In case, a student of first year of Thapar University gets a seat under this scheme then the seat vacated by such candidate shall be offered to other candidates in the merit list.
- The candidates who will get admission under International Engineering Program shall be shifted to Trinity College Dublin after the completion of their 4th semester at Thapar University.
- **GENERAL INFORMATION REGARDING BE/BTECH-DECEMBER 2015 ADMISSIONS INCLUDING ENTRANCE TEST SYLLABUS**

There shall be a test of 3 Hours duration in which multiple choice questions will be asked.

Equal number of questions will be asked from Physics, Chemistry, Mathematics and Biology sections. Candidates are required to attempt 3 sections. The candidates applying for BTech (Biotechnology) will have to attempt Biology section in place of Mathematics.

SYLLABUS FOR DECEMBER TEST

CHEMISTRY

1. **Atomic Structure:** Dual nature of matter and radiation, Heisenberg uncertainty principle, quantum mechanical model of atom (quantum designation of atomic orbitals and electron energy in terms of principal, angular momentum and magnetic quantum numbers), electronic spin and spin quantum numbers, Pauli's exclusion principle, *Aufbau* principle, Hund's rule, atomic orbitals and their pictorial representation, electronic configurations of elements.
2. **Classification of elements and periodicity in properties:** Modern periodic law and present form of periodic table, electronic configurations of elements and periodic table, electronic configuration and types of elements and s, p, d and f blocks, periodic trends in properties of elements (atomic size, ionization enthalpy, electron gain enthalpy, valence/ oxidation states and chemical reactivity).
3. **Chemical bonding:** Kossel-Lewis approach to chemical bond formation, ionic bonds, covalent bonds, polarity of bonds and concept of electronegativity, valence shell electron pair repulsion (VSEPR) theory, shapes of simple molecules, valence bond theory, hybridization involving s, p and d orbitals and shapes of molecules σ and π bonds, Hydrogen-bonding.
4. **Ionic equilibrium and Redox reactions:** Acids, Bases and Salts and their ionization, weak and strong electrolytes degree of ionization and ionization constants, concept of pH, ionic product of water, buffer solution, common ion effect, solubility of sparingly soluble salts and solubility products. Electronic concepts of reduction - oxidation, redox reactions, oxidation number, balancing of redox reactions.

5. **Solutions:** Vapour pressure of solutions and Raoult's Law, Colligative properties, lowering of vapour pressure, depression of freezing point, elevation of boiling points and osmotic pressure, determination of molecular masses using colligative properties, abnormal values of molecular masses, van't Hoff factor. Simple numerical problems.
6. **Electrochemistry:** Conductance in electrolytic solutions, specific and molar conductivity, variation of conductivity with concentration, electrolysis and laws of electrolysis, electrolytic and galvanic cells, emf. of a cell, standard electrode potential, Nernst equation.
7. **Coordination Compounds:** Basic ideas of Crystal Field Theory, colour and magnetic properties. Elementary ideas of metal - carbon bonds and organometallic compounds.
8. **Some basic principles of Organic Chemistry:** inductive effect, electromeric effect, resonance and hyperconjugation. Common types of organic reactions: substitution, addition, elimination and rearrangement reactions.
9. **Hydrocarbons:** Alkanes, Alkene and Alkynes: classification, nomenclature and important reactions. Aromatic hydrocarbons: structure and chemical reaction of benzene.
10. **Organic compounds with functional groups:** Relative reactivity and properties of Alcohols and phenols; Aldehydes and ketones: Carboxylic acids Amines.
11. **Polymers:** Classification of polymers, general methods of polymerization-addition and condensation: copolymerisation, some commercially important polymers (PVC, teflon, polystyrene, nylon-6 and 66, terylene and bakelite).

PHYSICS

1. **Measurement:** Units and dimensions, least count, significant figures and error analysis.
2. **Mechanics:** Kinematics in one and two dimensions, Circular motion, Relative velocity, projectiles, Newton's laws of motion; Inertial and noninertial frames of reference; Friction, Kinetic and potential energy, Work and power, Conservation of linear momentum and mechanical energy, Centre of mass and its motion, Impulse, Elastic and inelastic collisions, Law of gravitation, Gravitational potential and field, Acceleration due to gravity, Rigid body, moment of inertia, Angular momentum and its conservation law, Torque, Dynamics of rigid bodies.
3. **Properties of Bulk Matter:** Hooke's law, Young's modulus, Pascal's law, Buoyancy, Surface energy and surface tension, Viscosity, Stoke's law, Terminal velocity, Streamline flow, Bernoulli's theorem
4. **Waves and Oscillations:** Wave motion, longitudinal and transverse waves, Superposition of waves, progressive and stationary waves, Resonance, Beats, Speed of sound in gases, Doppler effect, Simple harmonic motions.
5. **Optics:** Reflection and refraction, Total internal reflection; dispersion, mirrors and lenses, Huygen's principle, Young's double-slit experiment.
6. **Heat and Thermodynamics:** Thermal expansion; Calorimetry, latent heat; Heat conduction, Newton's law of cooling; Ideal gas laws, Specific heats, Isothermal and adiabatic processes, Equivalence of heat and work, First law of thermodynamics, Blackbody radiation, Kirchhoff's law, Wien's displacement law, Stefan's law.
7. **Electricity and Magnetism:** Coulomb's law; Electric field and potential, Gauss's law, Ohm's law, Resistors and Capacitors in series and parallel, Energy stored in a capacitor, Kirchhoff's laws, Heating effect of current, Biot-Savart law and Ampere's law, Force on a moving charge and on a current-

carrying wire in a uniform magnetic field, Magnetic moment of a current loop, Faraday's law, Lenz's law, Self and mutual inductance, RC, LR and LC circuits, Electromagnetic waves, Displacement current.

8. **Modern Physics:** Atomic nucleus, Alpha and beta particles, gamma radiation; Law of radioactive decay, Binding energy, Fission and fusion processes, Photoelectric effect, Bohr's theory of hydrogen-like atoms, Characteristic and continuous X-rays, Moseley's law, de Broglie wavelength of matter waves.

MATHEMATICS

1. **Complex Numbers:** Solution of the quadratic equations. Algebraic properties of complex numbers. Argand plane and polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, solution of quadratic equations in the complex number system. Square root of a complex number. De Moivre's theorem.
2. **Continuity and Differentiability:** One to one and onto functions, composite functions, inverse of a function, Continuity and differentiability, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives.
3. **Applications of Derivatives: Rolle's and Lagrange's Mean Value Theorems their geometric interpretation:** Rate of change of bodies, increasing/decreasing functions, tangents and normals, use of derivatives in approximation, maxima and minima.
4. **Integration:** Integration of a variety of functions by substitution, by partial fractions and by parts. Definite integrals as a limit of a sum, Fundamental Theorem of Calculus, Basic properties of definite integrals and evaluation of definite integrals.
5. **Applications of the Integrals:** Applications in finding the area under simple curves.
6. **Differential Equations:** Order and degree. General and particular solutions of a differential equation. Formation of differential equation whose general solution is given. Solution of differential equations of first order and first degree by method of separation of variables of homogeneous differential equations. Solutions of linear differential equation of order one.
7. **Probability:** Conditional probability, multiplication theorem on probability, independent events, total probability, Baye's theorem, Random variable and its probability distribution, mean and variance of a random variable. Repeated independent (Bernoulli) trials and Binomial distribution.
8. **Matrices and Determinants:** Matrix operations (Addition, multiplication and scalar multiplication of matrices), Elementary row and column operations, inverse of a matrix, Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations
9. **Vector Algebra:** Properties and applications of scalar (dot) product of vectors, vector (cross) product of vectors, scalar triple product of vectors projection of a vector on a line.

BIOLOGY(FORB.TECH.BIO-TECHNOLOGY)

- 1. Diversity in living world:** Biodiversity; Characteristics of living organisms; Taxonomy and Systematics; Binomial nomenclature, Five kingdom classification, Current understanding on origin of species and evolution Salient features and classification of Monera, Protista, Fungi, Lichens, Viruses, Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms. Salient features and classification of animals along with diagnostic features of all Phyla.
- 2. Structural organization in animals and plants:** Morphology and modifications, Plant and Animal tissues; Anatomy and functions of different parts of a flowering plant; Anatomy and functions of different systems of an insect.
- 3. Cell Structure and Functions:** Cell theory and cell as the basic unit of life; Structure of prokaryotic and eukaryotic cell; Cell organelles–structure and functions of various cell organelles; Biomolecules-Structure and function of various biomolecules like proteins, carbohydrates, lipids, nucleic acids; Enzymes–types, properties, enzyme action; Cell division- Cell cycle, mitosis, meiosis and their significance.
- 4. Plant physiology:** Transport in plants- Movement of water, water relations, long distance transport of water, Transpiration, Guttation, transport of food, phloem transport.

Mineral Nutrition-Essential minerals and their role, deficiency symptoms; Hydroponics, mineral toxicity; Nitrogen metabolism–nitrogen cycle, biological nitrogen fixation.

Photosynthesis-Photosynthetic pigments, cyclic and non-cyclic photophosphorylation, Calvin cycle, C4 pathway.

Respiration-Exchange of gases, Respiratory quotient, Glycolysis, fermentation, TCA cycle, Electron transport system.

Plant growth and Development-Phases of plant growth, Plant growth regulators, Seed germination, seed dormancy, vernalisation, photoperiodism

- 5. Human physiology:** Digestion and absorption of food, breathing and respiration, disorders related to respiration, Body fluids and circulation, excretory products and their elimination, locomotion and movement, neural control and coordination, endocrine glands and hormones.
- 6. Reproduction:** Asexual and sexual reproduction; Sexual reproduction in flowering plants; Special modes–apomixis, parthenocarpy, polyembryony; Significance of seed and fruit formation; Human Reproduction-Male and female human reproductive systems; gametogenesis, embryo development, pregnancy and placenta formation, Emerging trends of reproductive health; prevention of sexually transmitted diseases, infertility and assisted reproductive technologies.
- 7. Genetics and Evolution:** Mendelian Inheritance; Deviations from Mendelism–Incomplete dominance, Co-dominance, Multiple alleles and Inheritance of blood groups; Pleiotropic inheritance, Polygenic inheritance, Chromosomes and genes; Sex determination–In humans, birds, honey bee; Linkage and crossing over

Sex linked inheritance- Haemophilia, Colour blindness; Mendelian disorders in humans–Thalassemia; Chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes; Molecular Basis of Inheritance-DNA as genetic material, structure of DNA and RNA, DNA packaging, DNA replication; Central dogma; Transcription, genetic code, translation; Gene

expression and regulation—the lac operon; Genome and human genome project; DNA finger printing;

- 8. Biology and Human Welfare:** Health and Disease-pathogens, parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm); Basic concepts of immunology—vaccines, Cancer, HIV and AIDs, Adolescence, drug and alcohol abuse.
- 9. Biotechnology and its Applications:** Principles of Biotechnology-Genetic engineering (Recombinant DNA technology); Application of biotechnology in health and agriculture-human insulin and vaccine production, gene therapy; Genetically modified organisms-Bt crops, transgenic animals; Biosafety issues—biopiracy and patents; Improvement in food production-plant breeding, tissue culture, single cell protein, biofortification; Microbes in human welfare- food processing, industrial production, sewage treatment, energy generation, biocontrol agents and biofertilizers.
- 10. Ecology and Environment:** Biosphere, habitat and niche, population and ecological adaptations, population interactions; Patterns and components of ecosystems, Nutrient cycling (carbon and phosphorous); Ecological succession; Ecological Services—Carbon fixation, oxygen release; Biodiversity and its conservation; Environmental issues-air pollution and its control, water pollution and its control, agrochemicals and their effects, solid waste management, radioactive waste management; Greenhouse effect and global warming; Ozone depletion; Deforestation.