

Atul Gupta P.A.  
S.V.B.P.U.A. & T., Meerut

**Proceeding of xxiii meeting  
of the Academic Council  
held on 29.4.2006**



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**Sardar Vallabh Bhai Patel University  
of Agriculture & Technology,  
Meerut – 250 110**

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Meerut – 250 110**

**PROCEEDING OF XXIII MEETING OF ACADEMIC COUNCIL HELD ON APRIL 29, 2006**

**Following were present**

1	Dr. M.P. Yadav	Vice-Chancellor/ Chairman
2	Dr. Narendra Sharma	Registrar/ Secretary
3	Sri. N.N. Yadav	Comptroller
4	Dr. I.B. Singh	Actg. Director Research
5	Dr. O.P. Singh	Actg. Director Extension
6	Dr. Y.P. Singh	Actg. Dean PGS
7	Dr. V.K. Yadav	Actg. Dean (Biotech.)
8	Dr. Kharag Singh	Prof. & Head (Soil Science)
9	Dr. B. Ram	Prof. (Soil Science)
10	Dr. P.L. Saroj	Professor (Horticulture)/DSW
11	Dr. Brijendra Singh	Prof. & Head (Agric. Economics & Mgt.)
12	Prof. Samsher	Prof. & Head (Agric. Engg. & Food Technology)
13	Dr. N.S. Rana	Prof. & Head (Agronomy)
14	Dr. Raghuvir Singh	Prof. (Agronomy)
15	Dr. Ashok kumar	Prof. (Soil Science)
16	Dr. L.R. Singh	Prof. (Agronomy)
17	Dr. R.L. Singh	Prof. & Head (Agric. Comm. & Rural Development)
18	Dr. R.R.P. Chaudhary	C.T.O. / Jt. Director Extension
19	Dr. R.N. Yadav	C.T.O. / Jt. Director Extension
20	Dr. R.D. Sharma	Prof. (Soil Science)
21	Dr. O.D. Sharma	Prof. (Extension)
22	Dr. S.K. Tomar	Prof. (Plant Breeding)
23	Dr. Babu Ram	Assoc. Director (Horticulture)
24	Dr. S.A. Kerkhi	Assoc. Prof. (Genetics & Plant Breeding)
25	Dr. P.K. Rai	Assoc. Prof. (Recombination Techniques)
26	Dr. R.S. Sengar	Assoc. Prof. (Biochemistry & Physiology)
27	Er. N.C. Gupta	SMS (Agric. Engg.)
28	Er. B.D. Tirpathi	SMS (Agric. Engg.)
29	Dr. Shalni Gupta	Asstt. Prof. (Molecular Biology & Genetics Engg.)
30	Dr. Purshottam	Asstt. Prof. (Pathology & Microbiology)

The Hon'ble Vice-chancellor chaired the meeting. Following agenda items were discussed and finalized.

**Agenda Items**

**Agenda 1 Confirmation of minutes of XXII Academic Council meeting held on 12-12-2006.**

The Minutes of XXII Academic Council meeting held on 12-12-2005 were confirmed.

**Agenda – 2 Proposal for information of the Academic Council about Information-Bulletin and notice for the academic session 2006-2007.**

The proposal related to the Information-Bulletin along with the notice was discussed and finalized for the session 2006-2007. Even though, it had already been discussed in the Academic Council meeting held on dated 12.12.2005 and approved, but in view of the combined test of all three SAU's, the modifications in the bulletin were made. As per decision taken by the Govt., combined entrance examination for the session 2006-07 is being conducted by N.D.U.A.&T., Faizabad. The proposal put up by the secretary was approved as such in the Academic Council.

**Agenda – 3 The proposal for refund of fees of hostel room charges collected from the students.**

The proposal put up by secretary Academic Council was discussed. This proposal had already been discussed and finalized in the HOD meeting held on dated 12-7-2005 under the chairmanship of the then Hon'ble Vice-Chancellor. The House discussed thoroughly about the refund of room charge because previously room charges were collected as per two students sharing a room, but due to shortage of rooms three students are being accommodated in one room. Therefore, extra fees of hostel room charge should be refunded to the students. Keeping this in mind, the proposal is as below:

Charge/Student/Semester	Old	New
Common room charge	100	100
Double seated room	700	700
Triple seated room	700	434
Total (Double seated room)	200+1400 = 1600	200+1400 = 1600
(Triple seated room)	300+2100 = 2400	300+1302 = 1602

Proposal was approved and it was also decided that above decision would be effective from 12-7-2005.

**Agenda – 4 Any other item with the permission of the Chairman.**

The following agenda items were permitted by the Chairman and discussed in the meeting.

**(i) Constitution of Post Graduates Faculty**

The proposal was put up by the Actg. Dean PGS which was discussed point wise and approved as below:

For Faculty Secretary, the name of Dr. Ashok Kumar, Professor, Soil Science was proposed and approved as Faculty Secretary by the members of faculty of PGS.

Secretary of the faculty Dr. Ashok Kumar then informed the members that as per Act & Statutes of Pantnagar Agriculture University which is being followed by this university also, the Board of the PG Faculty shall be constituted as follows.

1. The Dean of the college of Post Graduate Studies, who shall be the Chairman.
2. All Deans and Directors.
3. Heads of Departments and Professors in the university.
4. Director of the Agril. Experiment Station

The members of the Academic Council agreed and passed the proposal of the Actg. Dean PGS.

**(ii) Award of Ph.D. Scholarship/fellowship**

The agenda was put up by the Actg. Dean PGS. The members of the committee discussed thoroughly and decided that name in the above agenda should be scholarship and not fellowship. Although the proposal was also earlier put up in the faculty of College of Agriculture, it was passed-on to the faculty of PGS by the Secretary Faculty of Agriculture. The following decisions were made and finalized regarding the award of Ph.D. scholarship after detailed point wise discussion in the meeting.

- These regulations shall apply to the students admitted to various Ph.D. programmes in the academic year Jan. 2006 and thereafter through Entrance Examination. However, the students of previous batches on the roll of the university will be entitled to get the scholarship from January 2006 onward for the left over period of their degree programme.
- The value of scholarship shall be Rs. 1500 per month or as revised as per state government decision from time to time. The Board of Management shall approve it on the recommendation of the Academic Council. Normally, there shall be two scholarships in each discipline. The total number of scholarships thus provided are not utilized due to any valid reasons whatsoever, the university shall be free to redistribute the allocation of the vacant scholarship position and award the same to other students who could not be granted scholarship in the first instance due to the aforesaid restriction of two scholarships in each discipline. However, this latter award shall be based on the academic rating and shall be made after all admissions in question have been made for the academic year.
- Application for the scholarship shall be made by the concerned student on the prescribed form obtainable from the office of the Dean Student Welfare and shall be submitted through Advisor, Head of the majoring Department, Dean of the college concerned, Director Agricultural Experiment Station and the Dean Post Graduate Studies.
- The scholarship shall commence from the date of the registration of the students in the semester of his/her admission and shall be tenable for a maximum of 36 months during Ph.D. programme of the candidate. However, the payment of scholarship for any semester shall be made only after satisfactory performance of the student in that semester.
- Student on Academic or Conduct Probation shall not be eligible for this scholarship.
- Continuance of the scholarship shall be subject to the satisfactory performance of the student concerned in academic programmes as well as his conduct. The scholarship may, however, be restored with effect from the date the academic performance as well as his conduct is rated satisfactory
- In case, the student drops a semester or discontinues his studies he shall lose the scholarship for that semester. In case a student drops a semester after studying some time in the semester he shall loose the scholarship for the remaining part of the semester. The scholarship may, however, he restored in such case only after the student is allowed to resume his studies and will be tenable for a period not exceeding 36 months.
- A student awarded the scholarship will devote his whole time to the approved study and will not be allowed to accept any financial assistance from other agencies. In the event of award of outside scholarship, the recipient shall have to refund the amount

paid to him by the university for the duration for which outside scholarship has been availed by him. In such cases, the scholarship may be awarded to the student next in the rating for the duration for which the outside scholarship has been availed.

- The scholarship will be terminated on the date:
  1. The recipient ceases to be on the roll of the university
  2. The recipient completes his degree programme, i.e., submission of his thesis etc.
  3. The recipient is awarded any punishment by the competent authority either on the recommendation of the College Discipline Board or on the recommendation of Discipline Committee. In such cases, the scholarship may be awarded to the students next in the rating.
- The award of scholarship will be made by the Dean Student Welfare. However, the records and accounts will be handled by the Comptroller Office.
- The Advisor of the concerned recipient would submit a progress report of the work through proper channel to the Dean Student Welfare at the end of every semester failing which his scholarship will not be renewed.
- The scholarship may also be terminated by the Vice-Chancellor at any time without assigning any reason and in all matters not provided in these regulations, the decision of the Vice-Chancellor shall be final.

**(iii) Award for UG Students.**

The proposal was put up by the secretary, faculty of Agriculture that one medal i.e. *Vice-Chancellor's Gold Medal* and a certificate of the same may be given to one UG student who has secured highest Overall Grade Point Average (OGPA) in under graduate degree programme.

Regarding the matter, a committee will be constituted. The committee will decide and recommend the awards of medals to be given to the students, for finalization, in the next Academic Council meeting.

**(iv) Proposal for inclusion of course "Physical Chemistry of Soil, APS 509" in the course programme of PG student of Soil Science**

The proposal was put up by Dr. Ashok Kumar, Professor, Soil Science that for the uplifting of knowledge regarding chemistry of soil for the PG student, it is necessary that above mentioned course should be the core course programme for the department. This course will be useful for further research in soil. Therefore, it is essential to add this course in core course programme of the department.

All members discussed the matter, the Hon'ble Vice-Chancellor and chairman of the committee suggested that the proposal must come through faculty of PGS. He also suggested that a course curriculum committee should be constituted who will take care of all such the matters in the future

**(v) Proposal for approval of course content of B.Tech. (Biotech.) courses, change of title of two courses and shifting of one course from one department to another department in College of Biotechnology**

The proposal was put up by Actg. Dean College of Biotech. The course contents of all the B.Tech. (Biotech.). Courses were approved as such. The details of the entire course curriculum including the changes approved in this Academic Council meeting are as follows:

## Description of Course

**Course Title** : **Elementary Biology**  
**Course No.** : **BBB 110**  
**Credit Hours** : **3 (2,0,1)**

Introduction to the living world, Diversity and characteristics of life, Systems of classification. Theory of Binomial nomenclature. Classification of plants and Animals, histology(plants and Animal Tissues) Diversity of plants and brief study of Algae ,fungi ,Bryophytes, Pteridophytes, Gymnosperms and Angiosperms, Morphology of root ,stem ,leaf, inflorescence and flower, systematics and ecology. Structure of cell and cell division, heredity and genetics, origin of life and Evolution.. Economic importance of plants.

**Practical based on above course.**

**Course Title** : **Elementary Mathematics**  
**Course No.** : **BPM – 110**  
**Credit Hours** : **3 (3-2-0)**

Co-ordinates: Distance between two points, coordinates of a point of divisions of straight line joining two points, area of triangle and quadrilateral, equation of straight line, change of axes, circle, parabola and ellipse. Simple problems based on them. Functions: Limit continuity, differentiation, equations of tangent and normal, maxima and minima. Methods of integration including integration by part. Definite integrals, application of definite integrals in finding areas under curves. Determinants: Matrices, matrix addition and matrix multiplication, transpose of matrix, solution of linear equations using Crammers rule.

**Course Title** : **Elementary Agriculture**  
**Course No.** : **APA – 110**  
**Credit Hours** : **3 (2-0-1)**

Indian Agriculture-scope and resources; crop plant their significance as source of food, feed, fuel, and raw material for various industries; crop seasons and classification of crops. Soils- their formation, classification and physical properties. Essential plant nutrients, manures and fertilizers, uptake of N,P, & K by important crops, methods of manure and fertilizer application, composition of bulky organic manures, concentrated organic manures, green manures and various types of inorganic fertilizers. Irrigation and drainage- importance of water, quality of irrigation water; sources, methods and measurement of irrigation water. Cultivation of important crops in U.P. wheat, rice, cotton, sorghum, maize, groundnut, rape and mustard, chickpea, pigeonpea, tobacco, berseem, potato and sugercane. Acquaintance with horticultural crops such as- cabbage, cauliflower, onion, garlic, cucurbits, root crops, peas, tomato, brinjal, banana, apple, mango, litchi, guava. Introductory economics :- Factors of Production, exchange, different types of markets, pricing, banks and credits. Study of main breeds of animals such as cows, buffalo, goat, sheep, and poultry. Care of animals and poultry management, common medicines. Different types of plough, mechanical devices, their management and cost. Necessity for drainage, prevention and formation of acidic and alkaline soils.

**Practical based on above course.**

**Course Title** : **Elementary Physics**  
**Course No.** : **BCP 110**  
**Credit Hours** : **2 (1-0-1)**

Measurement of physical quantities, measurement of thickness, velocity and acceleration Units and dimensions, laws of motion : particle kinematics, average velocity, instantaneous velocity, motion with constant acceleration. Freely falling bodies, force, Newton's laws of motion, work and energy : work done by a constant force, kinetic and potential energy, power, conservation of energy, oscillations : oscillating systems, simple harmonic motion, simple pendulum, rotational dynamics : moment of inertia, Kinetic Energy of rotation, torque, combined rotational and translational motion. Temperature and heat : temperature and its measurements, heat capacity and specific heat, heat capacities of ideal gas, light : visible light, the speed of light, laws of reflection and refraction, Doppler effect.

**Practical based on above course.**

**Course Title** : **Elementary English**  
**Course No.** : **BHE 110**  
**Credit Hours** : **2 (1-0-1)**

Testing comprehension, interpretation and writing skills through – Unseen comprehension passages and Précis writing; Composition- letter writing, purpose / objective; Kinds: formal and informal; Letter Components: essential & optional elements; Letter Formats (Formal & Informal); Criteria for different types of letters: inquiry, complaint, placing order, sales, quotation, application, letters urging action, good news letters, bad news letters, letters of introduction, letters of certification, letters to friends, relatives, family members & acquaintances ; Bio-data writing – definition, characteristic features and writing of Bio-data; Dialogue- writing : definition, salient features of a well-written and spoken dialogue ; Single Sentence Definitions ; Grammar & Punctuation : For spotting errors / Editing in different parts of speech ; Punctuation – apostrophe, comma, period, colon, semi-colon, hyphen, dash, exclamation mark, ellipsis, parenthesis, mark of interrogation, quotation marks and capital letters ; Vocabulary Enrichment - Homonyms : their definition, meaning and usage in sentences.

**Practical based on above course.**

**Course Title** : **Elementary Organic Chemistry**  
**Course No.** : **BPC 110**  
**Credit Hours** : **3 (2-0-1)**

Introduction, historical development, importance of organic compounds. The properties of carbon atom, bonding and electronic structures of organic compounds, hydrocarbons, sources of hydrocarbons, preparation, properties and importance of saturated and unsaturated hydrocarbons, halogen derivatives of hydrocarbons, alcohols, ethers, aldehydes and ketones, acids and their derivatives and amines, cyclic compounds, hydrocarbons, benzene and its homologues, halogen derivatives alcohols, phenols, aldehydes and ketones, acids and their derivatives and amines; heterocyclic compounds, carbohydrates ; introduction, classification, reactions of monosaccharides, disaccharides and polysaccharides, lipids ; classification, general properties, fat and oils, soaps and detergents, waxes, phospholipids, glycolipids and sterols, amino acids and proteins ; amino acids and their properties, sources of proteins, classification, structural, physical properties and function.

**Practical based on above course.**

**Course Title** : **Structural & Spoken English**  
**Course No.** : **BHE 210**  
**Credit Hours** : **2(1-1-1)**

Structural patterns of communicative grammar; modern usages; functional language disorders and common structural errors in parts of speech- noun, pronoun, verb, adjective, adverb, preposition, conjunction, articles; word-formation and vocabulary building- affixes,

prefixes, suffixes, synonyms, antonyms, one word substitutions and foreign words; prepositions; phrases and idioms; gerunds; participles; infinitives; time and tense; modal verbs; conditional parities; synthesis; transformation; controlled writing – paragraph writing; study of modern technical prose; listening and reading skills; comprehension; phonetic and scientific systems of Spoken English – speech mechanism; symbols and sounds; stress and intonation.

**Practical based on above course.**

**Course Title** : **Structure and Property of Nucleic Acid**  
**Course No.** : **BTF 110**  
**Credit Hours** : **2 (2-0-0)**

Discovery of DNA as a genetic material (history with contribution of different workers). Chemical component of DNA (Purrier pyrimidines sugar, different bonds), Model of DNA (Watson and Crick, R-L model, tertiary structures, A-type, Btype, Z-type), Reassociation kinetics (Cot value, chemical complexity, kinetic complexity, especetitive and Non-respectitive DNA), Nucleosome model (Chromatin, histone and non histone protein, nucleosome phasing, higher order chromatin structures, nucleosome phasing, higer order chromatin structures, nucleosomes during DNA replication and transcription, chromatin domains, heterochrmatin structure and epigenetic domains, heterochrmatin structure and epigenetic gene regulation), Bacterial chromosomes, structure and functioning of mRNA, tRNA and rRNA.

**Course Title** : **Principles of Food Processing**  
**Course No.** : **AET 110**  
**Credit Hours** : **3(2-0-1)**

Introduction, concept and scope of food processing unit operations : Cleaning. Grading, drying, milling, handling and transport and packaging and storage etc. Processing od cereals, pulses, oil seeds, fruits and vegetables, dairy product processing etc. By- product utilization. Low temperature preservation, thermal processing of food, fermented food, dehydration process for foods, concentration / evaporation.

**Practical based on above course.**

**Course Title** : **Fundamentals of Computers**  
**Course No.** : **BPM 110**  
**Credit Hours** : **3(2-1-1)**

Introduction of computer : Basic components and their functions, hardware and software, input-output devices, basic concepts about and information. Binary, octal, decimal, hexadecimal number system. Bits and bytes, computer words coding (ASCII and EBCDIC), numeric data, Problem solving process, development of flow-chart, developing algorithms. Introduction to programming language. Program structure, 'C' should be used to develop an understanding of this part. Application of computers (Particularly database) in biology. Concept of operating system: functions, GUI, command based.

**Practical based on above course.**

**Course Title** : **Elementary Statistics**  
**Course No.** : **BPS 210**  
**Credit Hours** : **2(1-1-1)**

**Introduction:** Meaning and definition of Statistics, scope, importance, use and limitations of Statistics. Variables, random variables, frequency, frequency distributions, discrete and continuous data. **Measure of central tendency:** meaning of measure of central tendency, requirements of good averages. Types of averages, arithmetic averages, positional averages, A.M, G.M, H.M, Median, Mode with there relative merit and demerit uses, and



properties. **Measure of Dispersion:** Meaning of measure of dispersion. Different kinds of measure of dispersion, range quartile deviation, mean deviation, standard deviation. Merit, demerit and coefficients of different kinds of measure of dispersion. Coefficient of variation, Simple correlation and regression analysis. **Probability Theory:** Definition probability: classical or Mathematical probability definition, Statistical definition, axiomatic definition. Examples based on above definition. Theorems of probability; additive theorem of probability and mathematical theorem of probability. Conditional probability. **Hypothesis and test of significance:** Definition of hypothesis, null hypothesis, alternative hypothesis. Two types of errors, type first error and type second error. Testing of significance, level of significance. Different test of significance, T-test, F-test, Z-test, Chi-square tests. **Sampling theory:** Census v/s sampling, advantages of sampling over census, limitations of sampling. Errors in sampling: sampling errors and non-sampling errors. Different sampling methods: probability sampling, simple random sampling, stratified sampling, systematic sampling, cluster sampling and non probability sampling, convenience sampling, area sampling.

**Practical based upon above course.**

**Course Title** : **Biochemistry I**  
**Course No.** : **BTB 310**  
**Credit Hours** : **3 (2-0-1)**

Properties of carbon & organic compounds. Properties of water; pH and buffer. Structure & function of Biomolecules: Amino acids & peptides, Proteins, Enzymes, Carbohydrates, Lipids, biological membranes & transport across them and bioenergetics. Vitamin & coenzymes, Hormones, Nucleotides & nucleic acids. Carbohydrate metabolism: Glycolysis & Citric acid cycle. Structural and functional studies of myoglobin, catalase, lysozymes.

**Practical based on above course.**

**Course Title** : **Fundamentals of Genetics**  
**Course No.** : **BTM 210**  
**Credit Hours** : **4 (3-0-1)**

History and development of Genetics, Mendel's laws of inheritance, Lethality and gene interactions – pleiotropic genes, penetrance and expressivity, multiple alleles, structure of nucleus and chromosome – special types of chromosome, chromosome theory of inheritance, cell division – mitosis & meiosis, linkage, crossing over, Sex linkage, sex influenced and sex limited traits, sex determination & differentiation, chromosome aberrations, structural & numerical, mutations and mutagenic agents, cytoplasmic inheritance and maternal effects, fine structure of gene, organization of genetic material, quantitative inheritance.

**Practical based on above course.**

**Course Title** : **Organic Evaluation of Life & Molecule**  
**Course No.** : **BTC 110**  
**Credit Hours** : **2 (2-0-0)**

Origin of life: our universe, origin of solar system, Origin of earth, origin of life (Biopolesis), Various theories of origin of life, naturalistic theory of origin of life, chemogony (nature of primitive life and its evolution), Evolution of life: organic evolution, diversity in living organism. Maintenance of life: the living crust of the earth- Ecosystem, ecological pyramid, role of man in nature, theory of evolution- New Lamarckism, Darwin theory, mutation in evolution, New Darwinism, Human Evolution

**Course Title** : **Fluid Mechanics**  
**Course No.** : **AET 120**  
**Credit Hours** : **3 (2-1-1)**

Introduction, fluid properties, fluid statistics, manometers, static forces on immersed and curved surfaces, Buoyancy, fluid kinematics, conservation of mass, stream function and velocity potential flow net, Euler's equation, Bernoulli's equation, momentum and angular momentum equations, Kinetic energy and momentum. Dimensional analysis Rayleigh's method and Buckingham Pi theorem, dimensionless numbers, model scales. Pipe, flow energy losses, Darcy-Weibach equation, estimation of friction factor, minor losses, pipe flow computations, hydraulic gradient and total energy line. Open channel flow, velocity distribution, uniform flow, flow resistance equation, flow computations, flow measuring devices.

**Practical based on above course.**

**Course Title** : **Principles of Molecular Genetics**  
**Course No.** : **BTM 220**  
**Credit Hours** : **3 (2-0-1)**

Concept of the gene- molecular basis of inheritance, Molecular anatomy of the hereditary material- DNA structure, topology and topoisomerases, gene structure, chromosome structure and fundamental genome structure, Mechanism and regulation of cell division, Molecular mechanism of DNA replication and repair, Mutations- molecular basis, Recombination-mechanism and models, Molecular genetics of bacteria- plasmid, methods and hypotheses of conjugation, transformation and transduction, Molecular genetics of bacteriophage lamda- the genome packaging, replication and recombination, regulation of lytic cycle, regulation of lysogeny, in-vitro packaging, Molecular genetics of eukaryotes – gene structure & gene families, Genomic rearrangements-transposons/retroposons, Molecular genetics of organelles-mitochondria and chloroplast, Plant molecular genetics techniques and applications

**Practical:** Techniques based on above course outline

**Course Title** : **Biochemistry II**  
**Course No.** : **BTB 320**  
**Credit Hours** : **3 (2-0-1)**

Introduction to thermodynamics. Carbohydrate metabolism Pentose phosphate pathway, galactose metabolism, gluconeogenesis, electron transport & oxidative phosphorylation, photosynthesis. Lipid biosynthesis, biosynthesis of fatty acids, membrane phospholipids, triacylglycerols, cholesterol and isoprenoid. Fatty acid oxidation. Amino acid oxidation (nitrogen extraction & urea cycle), Amino acid biosynthesis. Nucleotide biosynthesis (*DE novo* & salvage pathways for purine/ pyrimidine biosynthesis). Degradation of nucleotides. Protein biosynthesis. Nitrogen metabolism.

**Practical based on above course.**

**Course Title** : **Microbiology**  
**Course No.** : **BTP 310**  
**Credit Hours** : **3 (2-0-1)**

Brief history and importance of microbiology. Prokaryotic and eukaryotic microbes: their cell structure. General account of fungi, bacteria and virus, their structural organization and classification. Microbial growth, nutrition and reproduction. Nature of viruses, organization of virion. Animal, plant and bacterial viruses. Bacterial reproduction. Distribution of microorganisms in nature. Soil microbes and their role in soil fertility and crop production. Microbes in human welfare- biofertilizers, biopesticides, antibiotics and compost. Microbial

decomposition of agricultural waste. General account of fungal bacterial and viral diseases of plants animals and human beings; causative agents, symptoms, mode of transmission and control.

**Practical based on above course.**

**Course Title** : **Cell & Molecular Biology**  
**Course No.** : **BTC 310**  
**Credit Hours** : **4(3-0-1)**

Basis of life, Introduction and history of Cell Biology, diversity of cell size and shape, cell theory, structure of prokaryotic and eukaryotic cells, nature of cytoplasmic matrix, chemical organization of cytosol, inorganic and organic compounds, Structure and functions of plasma membrane and cell wall, organelles of eukaryotic cell: Endoplasmic reticulum, Golgi apparatus, Lysosomes, Mitochondria, Plastids, Nucleus, Ribosomes.

Cytoskeleton, Cell cycle, cell growth and cell division. Cell differentiation in plants and animals, difference between normal and cancer cells, Organization of genes and genome, Structure and functions of chromosomes, DNA and RNA. Cellular communication, Programmed cell death, Signal transduction.

**Practical based on above course.**

**Course Title** : **Information Technology**  
**Course No.** : **BPM 220**  
**Credit Hours** : **2(2-1-0)**

Fundamentals Concepts of Information: Definition of information, Need of information, Quality of information, value of information, Concept of information Entropy, Information Contents, Introduction to information representation in Digital Media, Text, Images, Graphics, Animation, Audio, Video etc. Introduction to JPEG, MPEG, MHEG and other IT industry Standards, concepts of business data processing.

Computer & basic network concepts: software development Life Cycles, Software Coding, Testing, Software Maintenance, QA, ISO, CMM, Need for data Transmission over distances, types of Data transmission, Media for data transmission, networking of Computers-Introduction of Land and WAQN, Network Topologies, Basic Concepts in Computer networks, Client-Server Architecture, Communication protocols, Education Research Network (ERNET).

Internet and web technologies: Hypertext markup Languages, DHTML, WWW, gopher, FTP, Telnet, Web Browsers, Net Surfing, Search Engines, Email, Basic Concepts in E-Commerce, Public Key Cryptography, Digital Signatures, Network, Security, Firewall.

**Course Title** : **Introduction to Recombinant DNA Technology**  
**Course No.** : **BTR 310**  
**Credit Hours** : **3(2-0-1)**

**DNA isolation, purification, handling and analysis:** DNA isolation, purification and handling: Quantification of DNA content of a species (C-value; Chemical complexity), Microdensitometric analysis, Flo-Cytometry. Quantification of DNA in solution: Spectrophotometry, Gel Electrophoresis. Analysis of sequence Composition: Renaturation Kinetics (Kinetic Complexity), Sequencing, and Hybridization / DNA Probe (Radio & non Radiolabeled Probes)/ Southern Blotting. RNA isolation, purification, handling and analysis: RNA isolation, purification, and handling; in Lab. Quantification of RNA in solution: spectrophotometry, Gel Electrophoresis. Analysis and / or quantification of RNA.

Renaturation Kinetics, RT- reaction / c-DNA, Sequencing, EST, SAGE, Microarray/ DNA Chip, Hybridization / DNA Probes (Radio & nor labeled Probes)/ Northern Blotting, Subtractive Hybridization. **Organization of Genomes of Viruses, prokaryotes and Eukaryotes. Mapping: Cytological, Genetic, and Physical maps.** Cytological Maps, Maendel's laws of inheritance, Recombination frequency, Genetic maps, Molecular maps based on, RAPD, RFLP, AFLP, SSR, SNP, AP-PCR, Sequencing, Physical mapping; FISH, STS/STMS, Restriction endonuclease maps, Genome Sequencing Projects (Human, Rice, etc.). Vectors; Cloning and Expression. **Gene Identification and Isolation Strategies:** Gene Identification and isolation based on Genomic and cDNA libraries, PCR, Map based, Mutation using T -DNA, Transposons, and RNA-I, Antibody, and Protein. **Cloning Strategies.** General, Shot Gun and Hierarchical Cloning Strategies. **Analysis and Modification of DNA Sequences. Transformation and Expression of Cloned Fragments. Uses of Recombinant DNA Technology in** :Research: Medicine, Agriculture, Forensics, Other Commercial and Industrial Applications.

**Practical based on above course.**

**Course Title** : **Solid Mechanics**  
**Course No.** : **AET 210**  
**Credit Hours** : **3(2-1-1)**

Introduction fundamental of Engineering mechanics, concept of equilibrium: general equilibrium equation, statistically determinate and indeterminate system, classification, Moment of forces and effect, Laws of Mechanics and properties of materials, principle of moments, stresses and strains and kinds of stresses and strains. Analysis of two dimensional stress and strains: Transformation equation for plane stress and strain: Mohr's circles for stress and strain. Mechanical behavior of materials, types of materials, tests of materials and strengths. Analysis of bars of varying sections Tapering circular Rods, Rectangular Bar, Elastic constants, Support Reactions, Types of loads, Analysis of Frames, Center of Gravity and Moment of Interior shear stresses in beams, Bending stresses in Beams, Deflection of beams, Deflection of Cantilevers, Shear Force and bending moment diagrams. Torsion of circular shafts, deformation of circular shafts.

**Practical based on above course.**

**Course Title** : **Thermodynamics**  
**Course No.** : **AET 220**  
**Credit Hours** : **2(2-1-0)**

Introduction to thermodynamics: **Systems;** Closed system, adiabatic system, isolated system, open system, homogenous system, intensive, extensive and specific properties, thermodynamics state, thermodynamics equilibrium. **Temperature and zeroth law of thermodynamics, Pressure;** Density, specific weight, specific volume and specific gravity, Energy; Internal energy, kinetic energy, potential energy, process, cycle, **Different laws of thermodynamics. Pure substance;** Phase of pure substance, P.V. diagram of vaporization process, ideal gases. **First law of thermodynamics;** For closed system, heat, work, electrical work, comparison between heat and work, comparison between heat and work, Quasi equilibrium work; Isochoric process, isobaric process, isothermal process, polytropic process, adiabatic process, specific heat, P-V-T relations, Principle of conservation of energy, steady flow process, conservation of mass for steady flow process. Second Law of thermodynamics; Heat reservoirs, refrigerators and heat pumps, Air conditioners, Kelvin-Planck statements, clausius, clasiuum theorem and Entropy, Enthalpy. Thermodynamics Cycles; Diesel cycle, Otto

Cycle. Heat engines; Types of engine, terminology related to engine, nomenclature of I.C. engine, working of two stroke and four stroke cycle engine, difference between two stroke and four stroke cycle engine, different parts of I.C. engine and their functions.

**Course Title** : **Protein Synthesis**  
**Course No.** : **BTC 320**  
**Credit Hours** : **3(3-0-0)**

General Consideration, Major Breakthrough in Protein Synthesis, Ribosome, RNA and mRNA, Adaptor hypothesis, Central Dogma of molecular Genetics, Phases of Protein synthesis, Components in protein synthesis, Ribosome, tRNA, Activation of amino acids, Aminoacyl tRNA synthetases, Proof reading of some aminoacyl-tRNA synthetase, Genetic code, Direction of the growth of polypeptide chain, initiation of protein synthesis, translation of messenger RNA in 5'-3' direction, Shine- Dalgarno sequences, elongation of polypeptide chain, Codon recognition, peptide bond formation, Inhibitors of protein synthesis, eukaryotic protein synthesis, silent features of ribosomal protein synthesis, evolution of protein synthesis.

**Course Title** : **Metabolism**  
**Course No.** : **BTC 330**  
**Credit Hours** : **3(3-0-0)**

Introduction and outlines of metabolism. Experimental approaches to study the metabolism. High-energy compounds. Oxidation-reduction reactions. Carbohydrate Metabolism-glycolysis, TCA cycle and oxidative phosphorylation, metabolism of hexoses other than glucose, glycogen metabolism, pentose phosphate pathway. Metabolic pathways specific for microorganisms- fermentation: Anaerobic fate of pyruvate, Entner Duodroff Pathway, Glyoxylate cycle, Transketolase Cycle. Nitrogen metabolism-biological nitrogen fixation, plant growth regulators. Xenobiotic metabolism.

**Course Title** : **Biophysical Chemistry**  
**Course No.** : **BTB 330**  
**Credit Hours** : **4(3-0-1)**

**Solution, Buffers and Media:** Stock solutions, standard solutions, saturated solutions, buffers preparations. **Centrifugation:** Introduction, principle, types of centrifuges, type of rotors, ultra centrifugation, differential centrifugation, density gradient centrifugation, application and safety aspects. **Electrophoresis:** Introduction, principle, agarose gel electrophoresis of nucleic acids, polyacrylamide gel electrophoresis, DNA sequencing gels, PFGE (pulse field gel electrophoresis), electrophoresis of proteins (SDS PAGE, Native gels, gradient gels, isoelectric focusing gels, 2-D PAGE, detection estimation and recovery of proteins), capillary electrophoresis. **Chromatographic techniques:** Introduction, principle, sample preparation, adsorption chromatography, ion exchange chromatography, gas liquid chromatography, thin layer chromatography, paper chromatography, high performance liquid chromatography, affinity chromatography. **Radiotracer techniques:** Radioactivity, radio isotopes, types of radioactive decay, half life, measurement of radioactivity in biological samples (gas counters, scintillation counters), methods of labeling nucleic acids, auto radiography (principle and methods), use of radio isotopes and auto radiography in biological sciences, radiation exposure and biological affects, lethal dose, radioactive waste disposal, safety aspects. **Spectroscopic techniques:** Introduction, principal, ultraviolet and visible light spectroscopy.

**Practical based on above course.**

**Course Title** : **Data Management**  
**Course No.** : **BPM 310**  
**Credit Hours** : **2(2,1,0)**

Elements of database management system : Data base system concepts and architecture, data models scheme and instances, data independence and data base languages and interface, data definition languages, DML, Overall Database Structure, ER- model concepts, notation for ER diagrams, mapping constraints, Keys, Concept of Super Key, candidate key, primary key, Generalization, aggregation, reduction ER diagrams to tables, extended ER model, relationships of higher degree, relational data model concepts, integrity constraints, keys, domain constraints, referential integrity, assertions, foreign key, relational algebra.

Rdbms design & Sql: Functional dependencies, normal forms, first, second and third functional personal normal forms BCNF, Multi valued dependencies Codd Rules Example DBMS, SQL, data definition queries and updates in SQL Basic architecture, data definition and manipulation.

**Course Title** : **Basics of Electronics**  
**Course No.** : **AET 340**  
**Credit Hours** : **3(2,1,1)**

Initial development in electronics, recent development in electronics, applications, evolution of electronics, evolution of transistors, evolution of computers, electronic components: passive components, resistors, classification of resistors, linear resistors, fixed resistors, variable resistors, non linear resistors, thermistors, application of thermistors, resistor designation, capacitance, capacitors, classification of capacitors, inductance, inductors, type of inductors, voltage and current source, battery, regulated D.C. supply, concept of voltage source, ideal voltage source, practical voltage source conversion of voltage source in to current source, conversion of current source in to voltage source, structure of solids, classification of solid materials, insulators, metals and semiconductors on the basis of and gap, classification of semiconductors, mobility and conductivity, conductivity and mobility for intrinsic semiconductors, mass action law, charge densities in N-type and P- type semiconductors, the hall effect, hall effect applications, electrical properties of semiconductors, PN junction, Biasing of a PN-Junction.

**Practical based on above course.**

**Course Title** : **Immunology**  
**Course No.** : **BTI 310**  
**Credit Hours** : **3(2-0-1)**

Non specific defense, Skin and mucous membranes, Phagocytosis, Inflammation, Fever, Antimicrobial substance, Immunity, Types of Immunity, Types of Immune system (Innate and Acquired immunity), Acquired immune response, Complement system, Antigens, Antigen Processing and Presentation, Antibodies (Structure, classes of Immnuoglobulis), Genetics of Antibodies, Antibody diversity, Cell culture products, Vaccines, Interferon, recombinant Proteins, hybrid antibodies, Polyclonal and Monoclonal antibody, Antigens-Antibody Interactions, Precipitations Reactions, Immunodiffusion test, Counter current Immunoelectrophoresis, Agglutination reactions, Neutralization reactions, Radioimmunoassay, ELISA, DIBA, NASH, ISEM, Fluorescent antibody technique.

**Practical based on above course.**

**Course Title** : **Basics of Instrumentation**  
**Course No.** : **AET 350**  
**Credit Hours** : **3(2-0-1)**

Introduction to Instrumentation, functional elements of instruments and their preservation, Static performance characteristics, error and uncertainties in measurement systems. Dynamic performance characteristics: formulation of system equation, frequency response and Bode plot. Transducer elements: Analog transducer Electromechanical and optoelectrical, Digital transducer frequency domain, digital encoder, A-D converts, Intermediate elements: signal amplifiers, differentiating and integrating elements, Indicating, recording & display elements: digital voltmeter, CROS, servo potentiometric recorder, magnetic tape recorder, galvanometric recorders. Measurements and control of food processing parameters: temperature, pressure, flow measurement, specific gravity, viscosity, PH, humidity, moisture content etc.

**Practical based on above course.**

**Course Title** : **Gene Regulation**  
**Course No.** : **BTM 320**  
**Credit Hours** : **3(2-0-1)**

Introduction of gene expression and regulation, Levels of gene expression and regulation, Prokaryotic gene regulation- Basic mechanism of transcription, structure of promoter, DNA binding proteins, sigma factors, mechanism of attenuation, operon systems ( lac, trp and others), Eukaryotic gene regulation- general structure of eukaryotic promoter, cis acting elements and trans acting factors, control points to control gene expression, genomic control, transcriptional control, post transcriptional control ,translational regulation, Regulatory RNAs (RNAi, Sn RNA etc), Antisense RNA technology, Reporter genes, Protein stability

**Practical:** Techniques based on above course outline

**Course Title** : **Industrial Microbiology**  
**Course No.** : **BTP 410**  
**Credit Hours** : **3(2-0-1)**

History and scope of industrial microbiology. Major classes of products and processes. Microorganisms used in industrial processes. Industrial uses of microorganisms in production of lactic acid, vinegar, amino acid, insulin, alcohol, penicillin, citric acid and enzymes production. Baker's and food yeasts. Fermentation and fermenting microbes: history and design of fermenters (bioreactors), basic function of fermenters, types of fermenters, design and operation, types of fermentations. Preparation of culture; methods of preservation and maintenance of microorganisms. Microbiology of milk and milk products: yoghurt, kefir, and koumiss, butter milk, butter cheese, perin. Microbial contamination of meat: types of meat spoilage. Food preservation methods. Petroleum microbiology.

**Practical based on above course.**

**Course Title** : **Computer Graphics**  
**Course No.** : **BPM 320**  
**Credit Hours** : **3(2-1-1)**

Graphics input, Storage and communications. Display devices, Scan conversion. Introduction of programming Languages for CAD. An over view of C Programming Languages. Computer graphics, Transformations. Graphics Programming; Graphics standards Graphical Kernal system (GKS): Introduction, output, Co-ordinate system and

Transformations, input, segments, Metafiles operating states, levels, Programming examples in . GKS, Computer Aided drafting's.

**Practical based on above course.**

**Course Title** : **Heat Transfer Operation**  
**Course No.** : **AET 360**  
**Credit Hours** : **3(2-0-1)**

Introduction, Unit operations and classification, ; conversion factorsd, conduction through rectangular block, thick cylinder, sphere, concept of long mean rdius for thick. Walled cylinders. Variation of thermal conductivity with temperature, critical thickness of insulation, convection, natural and forced convection, film coefficient ant its comparison with thermal conductivity. Derivation of overall heat transfer coefficient from hot fluid to cold fluid through a metal wall. Effect of surface of surface coefficient on overall heat transfer. Dimensional analysis for heat transfer. Co-current and countercurrent heat exchanges. Knowledge of various types of heat transfer equipments and their specific uses. Diffusion and mechanism, molecular diffusion, concept of distillation, concept of degrees of freedom, Constant boiling diagram, methods of distillation.

**Practical based on above course.**

**Course Title** : **Enzymology**  
**Course No.** : **BTB 340**  
**Credit Hours** : **3(2-0-1)**

**Introduction and historical perspective:** Introduction to Enzymes; Enzyme Structure, Classification & Nomenclature, Specificity of Enzyme action; Types of Specificity, Active site, Fischer lock & key hypothesis, Koshland induced fit hypothesis, Hypothesis involving strain transition state stabilization. Monomeric and oligomeric Enzymes. Introduction to Enzyme kinetics. Investigation of active site structure (Mapping the enzyme-substrate complex, use of substrate analogues, enzyme modification by chemical procedures). Effect of pH & Enzyme stability, Effect of temperature & Transition state theory. Allosteric enzymes, basic concepts, positive & negative effectors. Investigation of Enzymes in biological preparations: Extraction, Assay and Purification of enzymes, Application of Enzymes in medicine and industry, Biotechnological application of enzymes (Large scale production), Immobilized enzymes and their applications, Enzymes and recombinant DNA technology.

Reference: Understanding enzymes. Fourth Ed, Trevor Palmer. Prentice Hall-Ellis Harwood.

**Practical based on above course.**

**Course Title** : **Fermentation Technology**  
**Course No.** : **BTO 310**  
**Credit Hours** : **4(3-0-1)**

Introduction to fermentation. Selection for new metabolites. Strain development. Microbial growth kinetics. Substrates for industrial fermentation. Batch, Fed batch & Continuous culture of microbial cells. Microbial production of industrial enzymes: Proteolytic enzymes (Protease), Hydrolytic enzymes (Pectinases, Lipases), others like Glucose isomerase. Industrial fermentation for the production of antibiotics (Penicillins, Streptomycin, Cephalosporins), Healthcare products (Anticancer agents, pharmacologically active products), Food & Beverages (Ethanol, Lysine, Glutamic acid, Cheese Starters) & other chemicals (Citric acid, Acetic acid).

**Practical based on above course.**



**Course Title** : **Genomics & Functional Genomics**  
**Course No.** : **BTR 410**  
**Credit Hours** : **2(2-1-0)**

**Structural Genomics:** Genome organization in prokaryotes and eukaryotes, Mapping, genome sequencing, Bioinformatics (Genome Databases). **Functional Genomics:** Forward Reverse Genetics, **Transcriptomics** (c-DNA library, EST, SAGE, DNA-CHIP). Proteomics (proteome, 2-D Gel Electrophoresis, Protein Identification (immunoaffinity chromatography) and purification, Peptide fingerprinting, Mass Spectroscopy, Protein-Protein interaction (Yeast Two Hybrid System), Surface Plasmon Resonance (SPR) technique), Bioinformatics (protein Databases), **Metabolomics** (Metabolite profiling (identification and purification)). **Comparative and Evolutionary Genomics:** Genome evolution and Synteny.

**Course Title** : **Bioinformatics**  
**Course No.** : **BTR 320**  
**Credit Hours** : **2(2-1-0)**

**Historical Introduction and Overview:** Networks, Databases, and Information submission, retrieval and analysis. **Information Networks:** Internet, World Wide Web, Web browsers, HTTP, HTML, URLs, EMBnet, NCBI. **Protein information Resources Databases:** Biological databases, Primary sequence databases, Composite protein sequence databases, Secondary databases, Composite protein pattern databases, structure classification databases. **Genome information Resources / Databases:** DNA sequence databases (Genome sequence, EST, Gene expression, Transcription factor binding sites, Maps etc.), Specialized genomic resources. **Submission of Sequences (protein, DNA, RNA) in Databases:** Sequencing, Submission, Sequence accuracy, Computer storage of Sequence, Sequence formats, Conversion of one sequence format to another, Multiple sequence formats, Storage of information in a sequence database, Using the database access program ENTERZ. **Pairwise sequence alignment:** Definition, Significance and Methods of sequence alignment. **Multiple sequence alignment:** Uses, Relationship of multiple sequence alignment to phylogenetic analysis and Methods. **Database searching:** Introduction (Sequence similarity search with a single query sequence, fast searches, DNA V/s Protein searches, Scoring matrices for similarity searches PAM250, BLOSUM62, other scoring matrices), Methods (FASTA, BLAST, PSI-BLAST and other methods). **Analysis of Information in Databases:** Phylogenetic Predictions, Gene Predictions, Prediction of RNA secondary structure, Analysis of sequences (Genome, Transcriptome, Proteome etc.).

**Course Title** : **Communication Skills**  
**Course No.** : **ACD 330**  
**Credit Hours** : **3(2-0-1)**

**Fundamental of Communication;** Meaning, Process and importance of Communication, models of communication, barriers to communication, essentials of good Communication. **Modes of Human Communication;** Styles of communication, speaking, reading, writing & listening and non-verbal communication. **Spoken Communication;** Meaning and importance of this mode, effective presentation techniques, structure of an extension talk, Essential qualities of a speaker. **Written Communication;** Fundamental of sentence & paragraph structure, tips for effective news and paragraph writing, features of written communication. Writing for easy reading. **The Silent Communication;** Non-verbal Communication meaning, type and characteristics. **Use of Audio-Visual Aids for effective communication;** The role of audio-visuals in communication, designing overhead transparencies. **Meeting;** Purpose, types, procedure, planning, strategies and minute. **Practical: Based on above course.**

**Course Title** : **Bioseparation & Downstream Process**  
**Course No.** : **BTO 320**  
**Credit Hours** : **3(2-0-1)**

Introduction: An overview of Bioseparation, Separation of cells from fermented broth. Filtration & ultrafiltration. Centrifugation. Cell Disruption: Physical methods (osmotic shock, grinding with abrasives, solid shear, liquid shear), Chemical methods (alkali, detergents), Enzymatic methods. Product Isolation: Liquid-liquid extraction, Chromatography (Molecular sieve, Affinity, Hydrophobic, Ion Exchange & HPLC), Distillation.

**Practical: Based on above course.**

**Course Title** : **Principles and Application of Genetic Engineering**  
**Course No.** : **BTM 330**  
**Credit Hours** : **4(3-0-1)**

Basic concepts of gene cloning, Different types of gene transfer systems in plants and animals, Host-vector system –general characteristics of the vectors used in genetic engineering-viz. plasmid vectors, M 13 vectors, lambda vectors, cosmids, phagemids, artificial chromosomes, Tools of genetic engineering- enzymes used in gene cloning, Strategies of ligation and cloning, Genomic DNA and cDNA cloning, Genomic and cDNA library preparation, screening of libraries, Genome mapping and Marker assisted selection, Gene sequencing: Sanger's Method Maxim- Gilbert method and automated sequencing, Site-directed mutagenesis & applications, Expression vectors, Expression of cloned genes, Applications of genetic engineering

**Practical: Techniques based on above course outline**

**Course Title** : **Bioprocess Engineering**  
**Course No.** : **BTO 330**  
**Credit Hours** : **3(2-0-1)**

Bioreactor Design, Operation & Control: transport phenomena in bioprocess. Brief overview of bioreactors, design features & operation of stirred tank, air lift & fluidized bed reactors. Techniques of immobilization of enzymes of whole cells. Application of immobilized enzymes & whole cell system. Secondary metabolite production through hairy root cultures, bioprocess parameters for scale up of hairy root cultures. Upstream Processing: media for industrial fermentation, media sterilization, aeration & agitation in aerobic fermentations, selection criteria for fermentation air filters.

**Practical based on above course.**

**Course Title** : **Enzyme Kinetics**  
**Course No.** : **BTB 350**  
**Credit Hours** : **3(2-0-1)**

Kinetics of Single-Substrate enzyme-catalyzed reactions. Effect of substrate concentration derivation of Michaelis-Menten equation, Lineweaver-Burk plot.  $K_s$ ,  $K_m$ ,  $V_{max}$ ,  $K_{cat}$  & their significance. Methods to determine  $K_m$  &  $V_{max}$ . Enzyme Inhibition (Competitive, Uncompetitive, Non-competitive, Mixed, Partial, Substrate, Allosteric, and irreversible inhibition). Introduction to kinetics of multi-substrate enzyme catalyzed reactions (ping-pong bi-bi mechanism, random order). Chemical nature of enzyme catalysis (Acid base, electrostatic, covalent and enzyme catalysis), Mechanism of enzymes without cofactors, Metal activated enzymes and metalloenzymes, Coenzymes). Binding of ligands to proteins (Cooperativity, positive, homotropic cooperativity and Hill equation, Adair equation). Sigmoidal kinetics and allosteric enzymes (Monod-Wyman Changeux (MWC) model, Koshland-Nemethy-Filmer (KNF) model). Enzyme reaction mechanism, group

transfer reactions, oxidation – reduction reaction, elimination – substitution reaction. Kinetics of mixed inhibition. Computer simulation of regulatory, enzyme.

**Practical: Based on above course.**

**Course Title** : **IPR , Bioethics & Biosafety**  
**Course No.** : **BTO 340**  
**Credit Hours** : **2(2-0-0)**

Salient Features: Intellectual property, Patents, Copyright, and Trademarks. Patent Act (1970), Patent Act (2002). Different types of patents & specifications. Filing & processing of applications for patents. Biopiracy. Biodiversity in context to IPR.s.

Ethical Issues: definition & scope of bioethics, approaches for ethics, ethical issues in transgenics, gene therapy & cloning.

Biosafety of Transgenics: requirement for the assessment of food safety, limitations of risk assessment, Codex Alimentarius Commission (CAC). International biosafety protocol & CBD.

**Course Title** : **Tissue Culture Technology**  
**Course No.** : **BTO 210**  
**Credit Hours** : **3(2-0-1)**

Planning & organization of a tissue culture laboratory. Basic techniques in plant & animal tissue culture, culture media & culture methods. Animal Cell Culture: Basic principles, Serum free & serum based media, Scaling up, Characterization & preservation of cell lines. Plant Tissue Culture: Fundamentals, Cellular totipotency, Callus, Direct organogenesis. Induction & maintenance of callus/ suspension cultures. Measurements of growth parameters. Role of tissue culture in rapid clonal propagation, production of pathogen free plants. Somatic embryogenesis & synthetic seeds. Somaclonal variations. Haploid production. Isolation & culture of protoplasts, protoplast fusion, identification & characterization of somatic hybrids.

**Practical: Based on above course.**

**Course Title** : **Environmental Biotechnology**  
**Course No.** : **BTP 320**  
**Credit Hours** : **3(2-0-1)**

Introduction, pollution monitoring, biotechnological treatment of waste, introduction of water microbiology, water borne infectious agents, detection and control of pathogenic microbes in water, sewage and sludge, physical, chemical and biological characteristics of waste water, waste water treatment, activated sludge process, biological nutrient removal, biotransformation and biodegradation of pollutants, Biodegradation of lignocelluloses and agricultural residues, use of fungi in biodegradation, molecular and biological techniques in characterization of microorganism in environment, emerging technologies: bioreporters, biosensors and microprobes.

**Practical: Based on above course.**

**Course Title** : **Animal Biotechnology / Plant Biotechnology**  
**Course No.** : **BTI 320 / BTF 310**  
**Credit Hours** : **3(2-0-1)**

#### **Animal biotechnology**

Introduction to Animal biotechnology, objectives of gene transfer, Vector's, Gene Constructs, Promoters, Reporter or Marker Genes, Transfection Methods, Heterologous gene expression, Embryonic Stem cell Transfer, Targetted gene transfer, Transgene interaction, Recovery of Genes Transferred into animal cells, High levels Expression of

transgene in animals cells, detection of Transgene's and development of Transgene function, Transgenic animal, Enhance trapping, cell culture products, In vitro fertilization, Embryo Transfer, Animal cloning, Animal Tissue culture, Organ Culture, cell Culture, culture media, Initiation of cell culture, Somatic cell fusion, Hybridoma technology, Bioethics.

**Plant Biotechnology** <sup>Practical:</sup> Based on above course.

Historical perspectives of Biotechnology: Genetic Engineering tools: Restriction enzymes, Ligases, Different, Vectors, Transformation of E.Coli, Screening Methods of recombinant clones, Construction & screening of genomic library, construction of CDNA library and its screening, Laboratory organization and tissue culture media; Cell, tissue and organ culture, crypreservation; Protoplast culture and applications; Plant regeneration and hardening; Micro-propagation of disease free plants; Somaclonal variation, Production of haploid plants; Bio-transformation. Production of secondary metabolites; Transgenic plants: gene constructs, vectors and transformation methods Commercialization of transgenic plants, Development of insect resistance herbicide resistance, slat and draught resistance in plants: IPRs and biosafety guidelines, Molecular markers and construction of maps; Molecular breeding and DNA fingerprinting. PCR: Principle types of PCR and application.

**Practical:** Based on above course.


The change in title of the course 'Data Management' to 'Data Base Management' was discussed in length and it was felt that the title 'Data Management' is more appropriate and therefore, it was decided that the name of this course be kept as such that is 'BPM 310 Data Management'. The change in title of the course 'BTR 310 Introduction to RDT Technology' to 'BTR 310 Introduction to Recombination DNA Technology' was also discussed in length and it was decided that the name of this course be changed to 'BTR 310 Introduction to Recombinant DNA Technology'.

Looking to the relatedness of course content of *BTC 310 Environmental Biotechnology*, it was approved that this course be shifted from Department of Cell Biology to the Department of Pathology and Microbiology as *BTP 320 Environmental Biotechnology*.

**(vi) Proposal for establishment of College of Veterinary and Animal Science**

The proposal for the establishment of college of Veterinary and Animal Science was put-up by Dr. Y.P. Singh, Prof. and Head, Animal Husbandry and Actg. Dean PGS. The proposal was accepted by the Academic Council with the comment that the provision of veterinary council of India may be followed for the development of laboratories, offices other programme & faculty institution etc, in different disciplines of the college. It was resolved to start the programme from academic session 2007-08.

The meeting ended with the vote of thanks to the Chairman.

  
Registrar/Secretary  
Academic Council