AMITY UNIVERSITY
RAJASTHAN

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Amity Institute of Biotechnology -Minutes of Board of Studies

2021-2022

AMITY UNIVERSITY RAJASTHAN
Amity Institute of Biotechnology

Minutes of meeting of the Board (BoS) of Study for BIOTECHNOLOGY programmes held at Amity Institute of Biotechnology, Amity University Rajasthan, on 29th Nov.2021; 10AM

1. The meeting of the BoS was convened by **Prof.(Dr) Vinay Sharma, Director AIB**
2. The following members of the BoS were present;
   a. **Prof.Nilima Kumari**, Department of Biosciences & Biotechnology, Banasthali Vidyapith, Tonk, Rajasthan as External expert member.
   b. **Prof. Bharat Singh**, Amity Institute of Biotechnology, Amity University Rajasthan, as Internal subject expert member.
   c. **Dr Vikram Kumar**, Assistant Professor, Amity Institute of Biotechnology, Amity University Rajasthan, as Internal subject expert member.
   d. **Dr Manali Datta**, Associate Professor, Amity Institute of Biotechnology, Amity University Rajasthan, as Internal subject expert member.
   e. **Dr S S Lakhawat**, Assistant Professor, Amity Institute of Biotechnology, Amity University Rajasthan, as Internal subject expert member.
   f. **Mr. Aadish Rawat,** student of B.Tech Biotechnology-VII sem, AIB, AUR (Special invitee)
   g. **Mr. Vikas Pandey,** student of B.Sc (H) Biotechnology-V sem, AIB, AUR (Special invitee)
   h. **Prof. Shruti Mathur**, Amity Institute of Biotechnology, Amity University Rajasthan attended and coordinated the meeting.

3. All agenda points as listed below were discussed and approved by all the members

S.No	Items	Existing	Purposed	Remarks/Justification
1	**For B.Sc (Hons) Biotechnology** Revision in course Titles and contents applicable for the upcoming semesters of Batch 2020 & 2021.	**BSB-302:** Animal Science-I **BSB-303:** Chemistry-III **BSB-404:** Animal Science - II **BSB-405:** Chemistry – IV **BSB-503:** Statistics for Biology **BSB-530:** Entrepreneurship Development **BSB-532:** IPR & Drug Regulatory Affairs	**BSB-302:** Animal Science **BSB-303:** Chemistry-III **BSB-404:** Scientific Writing **BSB-405:** Biomaterial and Biomimetics **BSB-503:** Bio-entrepreneurship **BSB-530:** Statistics for Biology **BSB-532:** IPR & Regulatory Affairs	To accommodate courses on 'Scientific Writing' and 'Entrepreneurship' (Annex-1)
2	**For B.Tech Biotechnology** Inclusion of new courses, applicable for the upcoming semesters of Batch 2020 & 2021.	**N/A**	BTB-534: Scientific Writing	To introduce new course of Scientific writing (Annex-1)

3	**For M.Tech Biotechnology** Revision in course Titles and contents, from the 2nd semester of Batch 2021	**MTB-131:** IPR and Drug Regulatory Affairs **MTB-204:** Advanced Biostatistics for Biologists **MTB-205:** Research Methodology and Scientific Writing **MTB-231:** Medical Biotechnoogy	**MTB-131:** Biosafety, Bioethics & IPR **MTB-204:** Advanced Biostatistics and Scientific Writing **MTB-205:** Advanced Medical Biotechnology **MTB-231:** Entrepreneurship development in Biotechnology	To accommodate courses on 'Scientific Writing' and 'Entrepreneurship' (Annex-1)
4	**For M.Sc Biotechnology** Revision in course Titles and contents, from the 2nd semester of Batch 2021	**MSB-131:** IPR and Drug Regulatory Affairs **MSB-204:** Advanced Biostatistics for Biologists **MSB-205:** Research Methodology and Scientific Writing **MSB-231:** Medical Biotechnoogy	**MSB-131:** Biosafety, Bioethics & IPR **MSB-204:** Advanced Biostatistics and Scientific Writing **MSB-205:** Medical Biotechnology **MSB-231:** Entrepreneurship development in Biotechnology	To accommodate courses on 'Scientific Writing' and 'Entrepreneurship' (Annex-1)

4. Meeting ended with vote of thank by Prof. Vinay Sharma.

Forwarded by:

29/11/21

Dr. Vikram Kumar

Asst Prof. AIB (Member BoS)

Prof.(Dr) Vinay Sharma

Director, AIB

Chairperson, BoS

2A

Minutes of meeting of the Board of Study (BoS) for BIOINFORMATICS programmes held at Amity Institute of Biotechnology, Amity University Rajasthan, on 29th Nov.2021; 11AM

1. The meeting of the BoS was convened by **Prof.(Dr) Vinay Sharma, Director AIB**
2. The following members of the BoS were present;
   a. **Dr P S Solanki**, Scientist, BISR Jaipur as External expert member.
   b. **Dr Surojit Bose**, Founder and Director, LeadInvent Pharma Inc., New Delhi, as External expert member (Industry Expert).
   c. **Dr Nidhi Mathur**, Assistant Professor, Amity Institute of Biotechnology, Amity University Rajasthan, as Internal subject expert member.
   d. **Dr Ravi Ranjan Niraj**, Assistant Professor, Amity Institute of Biotechnology, Amity University Rajasthan, as Internal subject expert member.
   e. **Ms. Gazal Bhargava**, student of B.Tech Bioinformatics-VIIsem, AIB, AUR (Special invitee)
   f. **Mr. Gurjot Singh**, student of B.Tech Bioinformatics-VII sem, AIB, AUR (Special invitee)
   g. **Prof. Shruti Mathur**, Amity Institute of Biotechnology, Amity University Rajasthan attended and coordinated the meeting.
3. All agenda points as listed below were approved by all the members

S.No	Items	Existing	Purposed	Remarks/Justification
1	**For B.Tech Bioinformatics** Inclusion of new courses, applicable for the upcoming semesters of Batch 2020 & 2021.	N/A	BTF-534: Scientific Writing	To introduce new course of Scientific writing (Annex-2)

4. Meeting ended with vote of thank by Prof. Vinay Sharma.

Prof.(Dr) Vinay Sharma

Director, AIB

Chairperson, BoS

3A

BoS recommendations for Academic Council

Board (BoS) of Study for BIOTECHNOLOGY programmes held at Amity Institute of Biotechnology, Amity University Rajasthan, on 29th Nov.2021; 10AM

S.No	Items	Existing	Purposed	Remarks/Justification
1	**For B.Sc (Hons) Biotechnology** Revision in course Titles and contents applicable for the upcoming semesters of Batch 2020 & 2021.	**BSB-302:** Animal Science-I **BSB-303:** Chemistry-III **BSB-404:** Animal Science - II **BSB-405:** Chemistry – IV **BSB-503:** Statistics for Biology **BSB-530:** Entrepreneurship Development **BSB-532:** IPR & Drug Regulatory Affairs	**BSB-302:** Animal Science **BSB-303:** Chemistry-III **BSB-404:** Scientific Writing **BSB-405:** Biomaterial and Biomimetics **BSB-503:** Bio-entrepreneurship **BSB-530:** Statistics for Biology **BSB-532:** IPR & Regulatory Affairs	To accommodate courses on 'Scientific Writing' and 'Entrepreneurship' (Annex-1)
2	**For B.Tech Biotechnology** Inclusion of new courses, applicable for the upcoming semesters of Batch 2020 & 2021.	**N/A**	BTB-534: Scientific Writing	To introduce new course of Scientific writing (Annex-1)
3	**For M.Tech Biotechnology** Revision in course Titles and contents, from the 2nd semester of Batch 2021	**MTB-131:** IPR and Drug Regulatory Affairs **MTB-204:** Advanced Biostatistics for Biologists **MTB-205:** Research Methodology and Scientific Writing **MTB-231:** Medical Biotechnoogy	**MTB-131:** Biosafety, Bioethics & IPR **MTB-204:** Advanced Biostatistics and Scientific Writing **MTB-205:** Advanced Medical Biotechnology **MTB-231:** Entrepreneurship development in Biotechnology	To accommodate courses on 'Scientific Writing' and 'Entrepreneurship' (Annex-1)
4	**For M.Sc Biotechnology** Revision in course Titles and contents, from the 2nd semester of Batch 2021	**MSB-131:** IPR and Drug Regulatory Affairs **MSB-204:** Advanced Biostatistics for Biologists **MSB-205:** Research Methodology and Scientific Writing **MSB-231:** Medical Biotechnoogy	**MSB-131:** Biosafety, Bioethics & IPR **MSB-204:** Advanced Biostatistics and Scientific Writing **MSB-205:** Medical Biotechnology **MSB-231:** Entrepreneurship development in Biotechnology	To accommodate courses on 'Scientific Writing' and 'Entrepreneurship' (Annex-1)

Annex-1

AMITY UNIVERSITY RAJASTHAN

Amity Institute of Biotechnology

Suggestions/Changes in the existing course syllabus

Date:-26/11/2021

Program & Semester	BSc (H) Biotechnology
Course Code	BSB-302
Course Title	Animal Science-I
Existing Content	*Course Contents:* Module I Historical perspectives, sterilization methods, organ culture - culture techniques, plasma clot, raft methods, agar gel, grid method, organ engineering. Cell culture substrates, cultural media, natural and artificial media, initiation and maintenance of cell cultures, cell culture products, cryopreservation techniques, immobilized cultures. Module II In vitro fertilization, Embryo transfer, Steps, Advantages and Disadvantages; Somatic cell hybridization, Monoclonal antibody, Hybridoma technology for monoclonal antibody production Module III Animal genetic engineering, Types of vectors, Gene transfer methods – Viral based (Adenovirus, Lentivirus, Retrovirus, Adeno associated virus), Non-viral based (Microinjection, Liposome, Electroporation, Nucleofection) methods of gene transfer Module IV Transgenic animal production, Steps, Advantages, Disadvantages, Transgenic animals as bioreactors for producing pharmaceutically important compounds and therapeutic etc. Module V Bioethical issues related to animal biotechnology (In vitro fertilization, Embryo transfer, Transgenic animals).
Proposed Change in Course Code/Title/Contents	**BSB-302: Animal Science** **Course Contents:** **Module I** General characteristics & classification of Amoeba & paramecium, Life cycle and pathogenicity of *Plasmodium vivax* and *Entamoeba histolytica* **Module II** Porifera: General characteristics and classification. Cnidaria: General characteristics a nd classification; corals and coral reefs; polymorphism in Cnidaria. Ctenophora: General characteristics and Evolutionary significance

Plz enclose external expert comments copy, if applicable

SA **Annex-1**

AMITY UNIVERSITY RAJASTHAN

Amity Institute of Biotechnology

Suggestions/Changes in the existing course syllabus

Date:-26/11/2021

Program & Semester	**BSc (H) Biotechnology**
Course Code	**BSB-303**
Course Title	**Chemistry- III**
Existing Content	**Course Contents:** **INORGANIC CHEMISTRY** **Module I** Acid and Bases: Elementary idea of Bronsted -Lowry and Lewis concept of acids and bases (Proton-donor acceptor and electrondonor acceptor systems), Relative strengths of Lewis acids bases and the effect of subsistent and the solvent on them. General properties of 3rd elements & Co-ordination Compounds: Molecular compounds, Werners coordination theory, IUPAC system of nomenclature of coordination compounds. Discussion of outer and inner orbit complexes. Preparation, properties, uses and structure of the following compounds -Tin Chlorides, hydrazine, hydroxylamine and acides, Oxides, Oxyacids and halides of phosphorus, tartaremetic, hydrogen sulphide (analytical applications), Oxides and Oxyacids of sulphur, Oxyacids of chlorine. **PHYSICAL CHEMISTRY** **Module II** Liquids: Vapor pressure, variation of vapour pressure of liquids with temperature (Clausious – Claperon Equation). Surface tension, viscosity, their experimental determination and applications. Parachor, Rheochor and their applications. Solutions: Henery's Law, Raoult's Law, critical solutions temperatures, fractional distillation and steam distillation. Osmosis and measurement of osmotic pressure. Effect of solutes on boiling points and freezing points of solutions, Calculations of molecular weights, abnormal molecular weight. **Module III** Heterogenous equilibria: Phase rule, phase diagrams of water and sulphur system. Nernst's distribution law, solvent extraction.
Proposed Change in Course Code/Title/Contents	**BSB-303: Chemistry- III** Course Contents: Module I: Inorganic chemistry Acid and Bases: Elementary idea of Bronsted -Lowry and Lewis concept of acids and bases (Proton-donor acceptor and electrondonor acceptor systems), Relative strengths of Lewis acids bases and the effect of subsistent and the solvent on them. General properties of 3rd elements & Co-ordination Compounds: Molecular compounds, Werners coordination theory, IUPAC system of nomenclature of coordination compounds. Discussion of outer and inner orbit complexes. Module II: Organic chemistry General study of aromatic compounds, orientation of aromatic compounds, aromaticity. Study of preparation and properties of Toluene, Halogen substituted aromatic compounds; Chlorobenzene, benzene diazonium chloride, Phenols, nitrobenzene, aniline

Plz enclose external expert comments copy, if applicable

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Annex-1

AMITY UNIVERSITY RAJASTHAN

Amity Institute of Biotechnology

Suggestions/Changes in the existing course syllabus

Date:-26/11/2021

Program & Semester	**BSc (H) Biotechnology**
Course Code	**BSB-404**
Course Title	Animal Science - II
Existing Content	**Course Contents:** **Module I** Introduction to Coelomates: Evolution of Coelom and Metamerism, Annelida: General characteristics and classification up to orders. Excretion in Annelida **Module II** Arthropoda: General characteristics and classification up to orders; vision and respiration in Arthropoda; Metamorphosis in Insects; social life in bees. Mollusca: General characteristics and classification up to orders; Respiration in Mollusca **Module III** Echinodermata: General characteristics and classification up to classes; water vascular system in Asteroidea; Larval forms in Echinodermata; Affinities with Chordates **Module IV** Introduction to Chordates: General Characteristics; outline classification, Protochordata: Hemichordata, Urochordata and Cephalochordata. **Module V** General characteristics of Pisces, Amphibia, Reptilia, Aves and Mammals
Proposed Change in Course Code/Title/Contents	**BSB-404: Scientific Writing** Course Contents: **Module 1** Introduction; Importance and basic rules of scientific writing; English in academic writing; Common error in Language; Structure of an original research article **Module 2** Writing an abstract; Literature review: Introduction, Source of literature; Process of literature review; Online literature databases; Literature management tools; Citing and Referencing; Different tools available, an Introduction to Mendeley and getting started with Mendeley, Add and managing references in Mendeley, Sharing, collaborating and other tools **Module 3** Ethics and Plagiarism Plagiarism: Introduction; Tools for the detection of plagiarism; Avoiding plagiarism **Module 4** Review Paper Writing, Research paper writing; Thesis Writing; Abstract/ Conference Paper/ Book/ Book Chapter writing; **Module 5** OERs: basic concept and licenses Open Educational Resources (OERs) for learning & Research; OERs development. Data - Collection, Visualisation, Representation, Analysis
Justification	The course addresses some of the more practical skills involved in writing about complex scientific information

Name of Subject Expert: Dr Manali Datta
Date & Sign: 26/11/2021

Plz enclose external expert comments copy, if applicable

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AMITY UNIVERSITY RAJASTHAN

Amity Institute of Biotechnology

Suggestions/Changes in the existing course syllabus

Date:-26/11/2021

Program & Semester	**BSc (H) Biotechnology**
Course Code	**BSB-405**
Course Title	Chemistry – IV
Existing Content	Course Contents: ORGANIC CHEMISTRY Module I: Carbohydrates General study of aromatic compounds, orientation of aromatic compounds, aromaticity. Study of preparation and properties of Toluene, Halogen substituted aromatic compounds; Chlorobenzene, benzene diazonium chloride, Phenols, nitrobenzene, aniline **Module II** Poly aromatic hydrocarbons; preparation and synthesis of Naphalene, alpha and beta napthol. Constitution of heterocyclic compounds for example pyridine and quinolene. Module III: Chemical Thermodynamics Energy, Work, Heat capacity. The first law of Thermodynamics, Heat of a reaction at constant pressure and constant volume. Hess's law, Kirchoff's Equations. The Second Law of Thermodynamics. Entropy (S). Determination of Entropy. Changes for reversible transition processes. Free Energy (G), Free Energy Change and chemical equilibrium. Module IV: Electrochemistry Galvanic cells, standard electrode potential, types of electrodes, measurement of pH. Module V: Photochemistry Lambert-Beer's Law: Law of photochemical equivalence; quantum efficiency, High and low quantum yields, reasons for high and low quantum yields, photoelectric cell. Phosphorescence and fluorescence.
Proposed Change in Course Code/Title/Contents	**BSB-405: Biomaterials and biomimetics** Course Contents: Module-I: Fundamentals Definition of biomaterials, requirements & classification of biomaterials, Properties of biomaterials; Biocompatibility & toxicological screening of biomaterials Module-II: Implant Materials Stainless steel, Co-based alloys, Ti and Ti-based alloys.Importance of stress-corrosion cracking. Classification according to thermosets, thermoplastics and elastomers. Importance of molecular structure, hydrophilic and hydrophobic surface properties, Biodegradable polymers for medical purposes, Definition of bioceramics, common types of bioceramics, the importance of wear resistance and low fracture toughness Module-III: Biomimetics Hierarchical structure, mechanical properties and fabrication of biomimetic biomaterials; Biomimetic coatings for biomaterial surfaces, Inspiration from animals, self-healing materials, Biomimetic in photonics, Various applications of Biomimetic

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AMITY UNIVERSITY RAJASTHAN

Amity Institute of Biotechnology

Suggestions/Changes in the existing course syllabus

Date:-26/11/2021

Program & Semester	BSc (H) Biotechnology
Course Code	BSB-503
Course Title	**Statistics for biology**
Existing Content	Course Contents: Module I Statistics and Biostatistics: Preliminary concepts; Measures of Central Tendency: Mean, Median, Mode Measures of Dispersion: Range, Standard deviation, Variance Module II Probability: Random Experiments, Trial and Event, Sample Space, Mutually Exclusive or Disjoint Events, Mutually Exhaustive Events, Equally Probable Events, Complementary Event, Classical definition of Probability, Statistical definition of Probability. Module III: Continuous Distribution Normal Distribution, Properties of Normal distribution Module IV: Correlation and Regression Bivariate distribution Correlation, Types of Correlation, Simple Correlation Coefficient for ungrouped data, Properties and Interpretation of Correlation Coefficient, Coefficient of determination, Scatter diagram, Standard Error, Probable error of Correlation Coefficient. Regression lines and Regression Coefficients, Properties of Regression Coefficients, Some examples. Module V: Introduction to the following Statistical terms Parameter, Statistic, Null hypothesis, Alternative hypothesis, Critical region, Type1 Error, Type 11 Error, Level of significance, P-value and its applications. Test of Significance for Small samples: One sample t-test, Paired t-test, Degrees of freedom for t-test, F test for equality of Population variances, Degrees of freedom for F-test.
Proposed Change in Course Code/Title/Contents	**BSB-503: BIOENTREPRENEURSHIP** Module I Need, scope and types of entrepreneurship management of self and understanding human behaviour, business ethics, performance appraisal, and (SWOT) analysis. Module II Market survey techniques, Criteria for the principles of product selection and development, Elements of Marketing & Sales Management- (a) Nature of product and market strategy (b) Packaging and advertising (c) After Sales Service (d) Pricing techniques. financial incentives, books of accounts and financial statements. Module III Technical feasibility of the project, plant layout & process planning for the product, Quality Control, Critical Path Method (CPM) and Project Evaluation Review Techniques (PERT) as planning tools for establishing SSI Module IV Desirables in start-up, Setting up Small, Medium & Large scale industry, Quality control in Biotech industries, Location of an enterprise, steps for starting a small industry, incentives and subsidies, exploring export possibilities

Plz enclose external expert comments copy, if applicable

Annex-1

AMITY UNIVERSITY RAJASTHAN

Amity Institute of Biotechnology

Suggestions/Changes in the existing course syllabus

Date:-26/11/2021

Program & Semester	**BSc (H) Biotechnology**
Course Code	**BSB-530**
Course Title	**Entrepreneurship Development**
Existing Content	Course Contents: Module I Need, scope and characteristics of entrepreneurship management of self and understanding human behaviour, business ethics, performance appraisal, and (SWOT) analysis. Module II Market survey techniques, Criteria for the principles of product selection and development, Elements of Marketing & Sales Management- (a) Nature of product and market strategy (b) Packaging and advertising (c) After Sales Service (d) Pricing techniques. financial incentives, books of accounts and financial statements. Module III Technical feasibility of the project, plant layout & process planning for the product, Quality Control, Critical Path Method (CPM) and Project Evaluation Review Techniques (PERT) as planning tools for establishing SSI Module IV Desirables in start-up, Setting up Small, Medium & Large scale industry, Quality control in Biotech industries, Location of an enterprise, steps for starting a small industry, incentivesand subsidies, exploring export possibilities
Proposed Change in Course Code/Title/Contents	**BSB-530: Statistics for biology** Course Contents: Module I Statistics and Biostatistics: Preliminary concepts; Measures of Central Tendency: Mean, Median, Mode Measures of Dispersion: Range, Standard deviation, Variance Module II Probability: Random Experiments, Trial and Event, Sample Space, Mutually Exclusive or Disjoint Events, Mutually Exhaustive Events, Equally Probable Events, Complementary Event, Classical definition of Probability, Statistical definition of Probability. Module III: Continuous Distribution Normal Distribution, Properties of Normal distribution Module IV: Correlation and Regression Bivariate distribution Correlation, Types of Correlation, Simple Correlation Coefficient for ungrouped data, Properties and Interpretation of Correlation Coefficient, Coefficient of determination, Scatter diagram, Standard Error, Probable error of Correlation Coefficient. Regression lines and Regression Coefficients, Properties of Regression Coefficients, Some examples. Module V: Introduction to the following Statistical terms Parameter, Statistic, Null hypothesis, Alternative hypothesis, Critical region, Type1 Error, Type 11 Error, Level of significance, P-value and its applications. Test of Significance for Small samples: One sample t-test, Paired t-test, Degrees of

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AMITY UNIVERSITY RAJASTHAN

Amity Institute of Biotechnology

Suggestions/Changes in the existing course syllabus

Date:-26/11/2021

Program & Semester	BSc (H) Biotechnology
Course Code	BSB-532
Course Title	IPR & Drug Regulatory Affairs
Existing Content	**Course Objective:** It will familiarize the students of the IPR issues and regulatory issues pertaining to health care industries. The unit will also cover the regulatory legislation and associated approvals and permissions required to conduct high-quality single-centre, national and international clinical trials.. Ethical issues will be considered throughout the unit. **Module-I** General Principles of Intellectual Property: Copyright, Trademark, Inventions-Patentable, Geographical Indications, Industrial Designs, Integrated Circuits, Trade Secrets. Patents: need of patents, major types of patents, International registration of patents, patent term and extension The Patents Act, 1970 – Salient features. Organization: Intellectual Property Rights, World Trade Organization (WTO), World Intellectual Property Organization (WIPO), Paris Convention, Berne Convention, TRIPS Agreement, the Doha Declaration, Patent Cooperation Treaty (PCT), Madrid Protocol. **Module-II** New Drug Application: Steps involved in the development of new drug. New drug applications as per WHO guidelines and abbreviated NDA. Requirement and guidelines on clinical trials, Investigational New Drug Application(IND). **Module-III** Regulatory affairs and its importance. Pharmaceutical Regulatory Procedures in India: Hierarchy and working flow of FDA in India, Role of DCGI / CDSCO in drug control, Drug Control Authority and its documentation in the state. National drug regulatory requirements, national drug policy, over view of schedule M, schedule Y, US FDA guidelines on IND, new drug approvals(NDA), ANDA approvals, SUPAC Changes, SNDA & post marketing surveillance.
Proposed Change in Course Code/Title/Contents	**BSB-532: IPR & Regulatory Affairs** Course Contents: **Module-I** General Principles of Intellectual Property: Copyright, Trademark, Inventions-Patentable, Geographical Indications, Industrial Designs, Integrated Circuits, Trade Secrets. Patents: need of patents, major types of patents, International registration of patents, patent term and extension The Patents Act, 1970 – Salient features. Organization: Intellectual Property Rights, World Trade Organization (WTO), World Intellectual Property Organization (WIPO), Paris Convention, Berne Convention, TRIPS Agreement, the Doha Declaration, Patent Cooperation Treaty (PCT), Madrid Protocol. **Module-II** New Drug Application: Steps involved in the development of new drug. New drug applications as per WHO guidelines and abbreviated NDA. Requirement and guidelines on clinical trials, Investigational New Drug Application(IND). **Module-III** Regulatory affairs and its importance. Biosafety- definitions - DBT guidelines on biosafety in conducting research in biology/biotechnology - Regulations of Genetically modified Organisms in India-

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Annex-1

	Biosafety regulation for transgenic plants and animals - labeling of GM foods.Role and responsibility ofDBT, BCIL, BRAI, DSIR, IBSC, RCGM, Animal Ethics Committee, Human Ethics Committee, FSSAI, CDSCO and USFDA
Justification	The syllabus was updated to incorporate the regulatory bodies involved in the biotechnology field.

Name of Subject Expert: Dr Manali Datta
Date & Sign: 26/11/2021

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AMITY UNIVERSITY RAJASTHAN

12A

Amity Institute of Biotechnology

Introduction of New Course

Date:-26/11/2021

Program & Semester	**B.Tech Biotechnology**
Course Code	BTB-534
Course Title	Scientific Writing
Proposed Content	Theory Course Objective: To develop understanding of information and science research issues in the domain of biotechnology through review of journal articles, invited talks, and critical group discussions of methods. The main objectives for this course are to develop: familiarity with information and science-oriented problems in the biotechnology, an understanding of research methods in the biomedical domain, critical thinking and evaluation skills and presentation and summarization skills. Course Contents: Module I Introduction: Science, Scientific Field and Biological research. Role of a researcher in different stages of a project, Routes to research funding (academic and commercial).Plagiarism: Introduction; Tools for the detection of plagiarism; Avoiding plagiarism Module II Research – Definition – Importance and Meaning of research – Characteristics of research – Types of Research – Steps in research – Identification, Selection and formulation of research problem – Research questions – Research design – Formulation of Hypothesis – Review of Literature. Concept of impact factor Module III: Computing skills for scientific research Web browsing for information search; search engines and their mechanism of searching; hidden Web and its importance in scientific research; internet as a medium of interaction between scientists; effective email strategy using the right tone and conciseness. Graphic designing -Approach and Significance in research Module IV Type of Articles (review, letters etc). Scientific paper format (Abstract, Introduction, Materials and Methods, Results, Discussion). Writing, evaluating, presenting and publishing the results of scientific research in the academic press (journals, conferences etc). Choosing the appropriate journal (Sources, Information, Instructions to authors, peer review system, journal evaluation) Module V Case studies of areas of current research. Formulating a research plan and its presentation References: · Scientific journals and magazines
Justification	To develop understanding of information and science research issues in the domain of biotechnology through review of journal articles, invited talks, and critical group discussions of methods.

Name of Subject Expert: Dr S S Lakhawat and Dr Bharat Singh

Date & Sign: 26/11/2021

Plz enclose external expert comments copy, if applicable

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AMITY UNIVERSITY RAJASTHAN

Amity Institute of Biotechnology

Suggestions/Changes in the existing course syllabus

Date:-26/11/21

Program & Semester	**M.Tech Biotechnology**
Course Code	**MTB131**
Course Title	**IPR & Drug Regulatory Affair**
Existing Content	**Module-I (Intellectual Property Rights-I)** Regulatory affairs and its importance. General Principles of Intellectual Property: Copyright, Trademark, Inventions-Patentable, Geographical Indications, Industrial Designs, Integrated Circuits, Trade Secrets.Patents: need of patents, major types of patents, International registration of patents, patent term and extension The Patents Act, 1970 – Salient features. **Module-II (Intellectual Property Rights-II)** Organization: Intellectual Property Rights, World Trade Organization (WTO), World Intellectual Property Organization (WIPO), Paris Convention, Berne Convention, TRIPS Agreement, the Doha Declaration, Patent Cooperation Treaty (PCT), Madrid Protocol. **Module-III (Drug Regulatory Affairs-I)** New Drug Application: Steps involved in the development of new drug. New drug applications as per WHO guidelines and abbreviated NDA. Requirement and guidelines on clinical trials, Investigational New Drug Application(IND). **Module-IV (Drug Regulatory Affairs-II)** Generic Drug Products: Drug Regulations – IND and NDA, Drug Regulations – ANDA, Generic Drug Product Development, Generic Drug Product Approval, SUPAC. Introduction about GMP, cGMP, GLP, GCP, CDSCO, CPCSEA, US-FDA **Module-V (Drug and Cosmetic Act)** Introductory drugs Jurisprudence: Drugs & Cosmetic Act & Rules
Proposed Change in Course Code/Title/Contents	**MTB131- BIOSAFETY, BIOETHICS & IPR** **Module-1:** **Intellectual Property:** Patents, Trademarks, Copyright, Related Rights, Industrial Design, Traditional Knowledge, Geographical Indications, Protection of GMOs,IPs of relevance to Biotechnology and Case Studies; Agreements and Treaties, Indian Patent Act 1970 & recent amendments. **Module-2:** **Patents and Concept of Prior Art:** Types of patent applications, Ordinary, PCT, Conventional, Divisional and Patent of Addition; Specifications: Provisional and complete; Forms and fees, Invention in context of "prior art". **Module-3:** **Patent Filing Procedures:** National & PCT filing procedure; Time frame and cost; Status of the patent applications filed; Precautions while patenting–disclosure/non-disclosure; Patent licensing and agreement Patent infringement. **Module-4:** **Biosafety:** Introduction to Biological Safety Cabinets; Biosafety Levels of Specific Microorganisms; Biosafety guidelines:Definition of GMOs & LMOs; Roles of Institutional Biosafety Committee, applications in food and agriculture; Environmental release of GMOs; Risk Analysis, Risk management and communication; National Regulations and relevant International Agreements,Cartegana Protocol. **Module-5:** **Bioethics:** Ethical implications of biotechnological products and techniques, Social and ethical implications of biological weapons.

Plz enclose external expert comments copy, if applicable

Justification	To create awareness on IPR issues and need for knowledge in patents in biotechnology, understand the biosafety regulations and ethical practices in biotechnology and become familiarize with the ethical practices in biotechnology.

Name of Subject Expert: Dr Vikram Kumar Yadav

Date & Sign: 26/11/2021

Plz enclose external expert comments copy, if applicable

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AMITY UNIVERSITY RAJASTHAN

Amity Institute of Biotechnology

Suggestions/Changes in the existing course syllabus

Date:-26/11/21

Program & Semester	**M.Tech Biotechnology**
Course Code	**MTB204**
Course Title	**ADVANCED BIOSTATISTICS FOR BIOLOGISTS**
Existing Content	**Module I:** Descriptive statistics Measures of Central Tendency (Mean, Median, Mode), Measures of dispersion (Range, Mean Deviation, Standard Deviation, Quartile Deviation), combined mean and variance, covariance, Graphs (Bar Chart, Pie Chart, Box Plot, Histogram, Ogive, scatter plot) **Module II** Probability (Addition and Multiplication Theorem), Binomial, Poisson and Normal distribution. Correlation and linear regression. **Module III:** Inferential statistics Formulation of Hypothesis (One-tailed & Two-tailed), Type I and Type II errors, power of a test, Significance of a test, P-value testing, **Module IV:** Hypothesis Testing (students T-test, Z-test, Chi-square test). Analysis of variance (ANOVA) **Module V:** Applications of statistical methods using statistical software
Proposed Change in Course Code/Title/Contents	**MTB204- ADVANCE BIOSTATISTICS AND SCIENTIFIC WRITING** **UNIT-I** Research Formulation - Defining and formulating the research problem - Selecting the problem - Necessity of defining the problem - Importance of literature review in defining a problem - Literature review - Primary and secondary sources - reviews, treatise, monographs-patents - web as a source - searching the web - Critical literature review - Identifying gap areas from literature review - Development of working hypothesis. **UNIT-II** Research design and methods - Research design - Basic Principles- Need of research design - Features of good design - Important concepts relating to research design - Observation and Facts, Laws and Theories, Prediction and explanation, Induction, Deduction, Development of Models. Developing a research plan - Exploration, Description, Diagnosis, Experimentation. Determining experimental and sample designs. **UNIT-III** Data Collection and analysis: Execution of the research - Observation and Collection of data - Methods of data collection - Sampling Methods, Sampling Errors - Data Processing and Analysis strategies - Hypothesis-testing - Generalization and Interpretation. **UNIT-IV** Quantitative Methods: Data presentation, statistical analysis and interpretation of data, types of analysis, simple regression analysis, correlation, coefficient of determination, (r2), z-test, t-test, ANOVA, Chi.square test, multi-variate analysis of data, multiple regression. Computer Application : Role of computer in research, data organization, software selection and its applications, solving problems by using scientific software and tools, sample programmes for analysis of data. **UNIT-V** Reporting and scientific writing: Structure and components of scientific reports, types of report, research paper report, review paper report, technical reports and thesis. Thesis writing - different steps and software tools (LaTeX.) in the design and preparation of thesis, layout, structure (chapter plan) and language of typical reports, Illustrations and

Plz enclose external expert comments copy, if applicable

	tables, bibliography, ,referencing and footnotes. Oral presentation - planning, software tools, creating and making effective presentation, use of visual aids, importance of effective communication. Selection of scientific journal based on indexing with Web of Science, Scopus etc., communication of manuscript with journals, revision in manuscripts.
Justification	To develop the skills and knowledge in research, types of research, interdisciplinary research, scientific methods of research, criteria of effective research, scientific interpretation of data using the biostatistics tools, scientific writing skills, and characteristics of an effective researcher.

Name of Subject Expert: Dr Vikram Kumar Yadav and Dr. Era Upadhyay

Date & Sign: 26/11/2021

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Annex-1

AMITY UNIVERSITY RAJASTHAN

Amity Institute of Biotechnology

Suggestions/Changes in the existing course syllabus

Date:-26/11/21

Program & Semester	**M.Tech Biotechnology**
Course Code	**MTB205**
Course Title	Research Methodology and Scientific Writing
Existing Content	**Course Contents:** **Module I** Introduction: Science, Scientific Field and Biological research. Role of a researcher in different stages of a project, Routes to research funding (academic and commercial) **Module II** Research – Definition – Importance and Meaning of research – Characteristics of research – Types of Research – Steps in research – Identification, Selection and formulation of research problem – Research questions – Research design – Formulation of Hypothesis – Review of Literature. **Module III: Sampling techniques** Sampling theory – types of sampling – Steps in sampling – Sampling and Non-sampling error – Sample size – Advantages and limitations of sampling. Collection of Data: Primary Data – Meaning – Data Collection methods – Secondary data – Meaning - Relevance's, Limitations and cautions. Statistics in Research. **Module IV** Type of Articles (review, letters etc). Scientific paper format (Abstract, Introduction, Materials and Methods, Results, Discussion). Writing, evaluating, presenting and publishing the results of scientific research in the academic press (journals, conferences etc). Choosing the appropriate journal (Sources, Information, Instructions to authors, peer review system, journal evaluation) **Module V** Case studies of areas of current research. Formulating a research plan and its presentation
Proposed Change in Course Code/Title/Contents	**MTB205- ADVANCED MEDICAL BIOTECHNOLOGY** **Module I** Clinical significance of biochemical tests and their role in the diagnosis and monitoring of disease, Clinical characteristic of disease. Role of pharmacological testing in clinical management of disease. Role of clinical biochemistry in detection, diagnosis and therapy of genetically inherited diseases and cancer. **Module II** Genetic disease, type of inheritance, single-gene and multifactorial inheritance, example of genetic diseases.Therapeutic intervention in blood disorder by stem cell transplantation/gene therapy. **Module III** Clinically important taxonomic grouping of bacteria, Staphylococci, Streptococci etc. Isolation and identification strategies of bacteria. Etiology-identification of disease agents and their source, transmission, portals of entry, nosocomial infections. Anti- microbial chemotherapy. Modes of action of major groups of antibiotics. **Module IV** Current topics in animal and cellular and molecular biology- cellular and molecular mechanism of human diseases,(cancer /diabetts) transgenesis-animal models of human diseases, animals for pharmaceutical protein production. Manipulation of reproduction and development for application in medicine, agriculture, aquaculture and conservation.

Plz enclose external expert comments copy, if applicable

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Annex-1

	Module V Epidemiology-epidemics, pandemics and endemics disease. Control measure of microbial diseases-public health control methods.Hygiene regulations, population screening for disease. Management of Clinical Data.
Justification	This is an important course which is now shifted to core courses from domain elective. Nowadays there is a need of qualified and skilled person in the field of medical biotechnology specially in the Diagnostics research lab, therefore the course contents updated accordingly.

Name of Subject Expert: Dr. Desh Deepak Singh

Date & Sign: 26/11/2021