(For The Candidates Admitted From 2016 Onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPALLI – 2

COURSE CONTENT AND SCHEME OF EXAMINATIONS

PG AND RESEARCH DEPARTMENT OF BIOTECHNOLOGY AND BIOINFORMATICS

M.Phil BIOTECHNOLOGY

COURSE CONTENT AND SCHEME OF EXAMINATIONS

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Title of the Paper</th>
<th>Code</th>
<th>Hrs/Week</th>
<th>Credit</th>
<th>Marks</th>
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<tr>
<td>I</td>
<td>Major Core 1</td>
<td>Research Methodology-techniques and their application</td>
<td>MPH15BT1C01</td>
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<td>I</td>
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<td>Molecular Modeling and Computer Aided Drug Designing</td>
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<td>II</td>
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UNIT-I

Colorimetry- Principle, working and applications of redox and pH-meter, buffers, estimation of macro molecules (protein, carbohydrate and nucleic acids), enzyme kinetics.

Spectrophotometry- ultraviolet and visible - principle, instrumentation and application of spectrophotometers.

X-ray Diffraction:- Structure factor expression, electron density equation, phase problems, Patterson function, molecular replacement method, heavy atom method, isomorphous replacement method, refinement procedure and interpretation of results. Fiber X-ray diffraction studies, single crystal X-ray diffraction studies and NMR studies on mono and oligonucleotides. Methods of data collection of crystal containing small molecule and large molecule, factors affecting the measurement of integrated intensities, photographic methods, diffractometers, area detectors and image plates.

UNIT -II

Different types of microscopic techniques- selection of suitable samples, and observation in different systems, study of living cells (light microscope, compound microscope, dark field microscope, phase contrast microscope, Normaski microscope, confocal microscopy, transmission electron microscopy (TEM) and scanning electron microscopy (SEM), atomic force microscopy (AFM), Cell sorting-flow cytometry

UNIT -III

Centrifugation- Types of rotors. Principles, instrumentation and applications of types of centrifugation techniques

Chromatography- techniques and principles and different types (Affinity chromatography, ion exchange chromatography, Gel exclusion chromatography, Gas chromatography, HPLC, TLC, paper chromatography). Isolation of natural products (extraction, purification and separation).
UNIT- IV

Electrophoresis - Principle and instrumentation of Agarose and Polyacrylamide Gel Electrophoresis (Native & SDS-PAGE). 2D gel electrophoresis.


Immunological Methods - Production of antibodies from laboratory animals, monoclonal antibodies. Routes of immunization, types of adjuvant and their importance, antigen antibody interaction, monoclonal and polyclonal antibodies. RIA & ELISA techniques-principle and applications, Immuno-radiometric assay- Principles and applications, Hybridoma.

UNIT-V

Statistics in biomedical research - Experimental design, Various sampling methods, Probability, frequency distribution average (arithmetic, geometric, means, mode and median) Standard Deviation, Standard Error of Mean, Degree of Freedom, Significance, t-test, Correlation, null hypothesis, distribution. Use of computers in data analysis.

REFERENCE BOOKS:
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPALLI – 2
M.Phil. BIOTECHNOLOGY- SEMESTER – I
MAJOR CORE: 2- APPLIED BIOTECHNOLOGY

Hours/Week: 6
Credit: 4
Mark: 100

UNIT I

Microbiology - Microbial growth Physiology- Overview of Basic Metabolism & Microbial Nutrition- reproduction in microbes- Applications of microbes- Biodegradation. Microbial Diseases & Chemotherapy/ Antibiotics.


UNIT II


Plant Biotechnology- Techniques in Plant tissue Culture - Tools in producing Transgenic plants and their preservation Gene Cloning -Transgenic plants in Agriculture & Industry- Plant Breeder’s Right(PBR) and Farmer’s Rights. Gene transfer techniques.

UNIT III

Recombinant DNA Technology- Molecular tools and their application- Gene amplification and its application. Construction of c-DNA and genomic DNA libraries, expression of cloned gene,


**UNIT VI**


**UNIT V**

**Patenting and IPR in Biotechnology** -IPR in the global economy, in international trade; Biodiversity related global IPR regime, TRIPS agreement, objectives and general principles, patents, trade secrets, UPOV convention; IPR and Biodiversity, sustainable use, Plant variety rights, Rights of traditional knowledge holders, the CBD, WTO, UNCTAD biotrade initiatives, government and regional initiatives, non-governmental initiated community intellectual rights, SRISTIs local innovations databases, peoples biodiversity register; Unsolved questions

**REFERENCE BOOK**

New York.
UNIT I: Communication skills
Type of communication
c. Life Science communication: approaches – delivery – content

UNIT II: Reaching Skills
a) Teaching objectives: Taxonomy of education objectives – Writing teaching objectives – importance of objectives.
b) Planning teaching: Content analysis – identification of appropriate subject materials – organization.
c) Teaching methods: appropriate teaching strategies – teaching aids.
d) Motivation: Need for motivation – Herzberg’s theory – Maslow’s theory.

UNIT III: Computer application skills (Lab Work)
a) MS Word: Preparation of word document.
b) MS Excel: Data entry, basic calculations and chart preparation.
c) MS Power Point: Preparation and presentation.
d) MS Paint: Drawing and editing a picture.
e) Photoshop (Adobe)

UNIT IV: Data Banks and Retrieval of information (Lab Work)
a) Internet: Browsing and saving web content
b) Protein-SWISS-PROT, PIR
c) Genome-EMBL, Genbank information resources
d) Structural databases and sequence alignment

e) e- Journal

UNIT V: Analysis of data with SPSS (Lab. Work)

a) Data entry and computation of descriptive and dispersion, correlation and regression co-efficient

b) Hypothesis testing with ‘t’ test and ANOVA, Interpretation and presentation of data.

c) Comparison of mean-single and paired ‘t’ test.

REFERENCE BOOKS:

OBJECTIVES
Provide a broad and thorough background in modeling tools and docking program. To understand the theories used to build tools and their relationship and basic concepts involved in drug designing.

UNIT I

UNIT II

UNIT III
Molecular Docking – principle – Types of docking – Ligand design – structure based ligand design – 3D database searching and de nova ligand design (outside in and inside out methods) using Discovery studio.

UNIT IV
Structure Based Design Methods-Structure based design methods to design novel inhibitors – QSAR using TSAR and its importance –Virtual Screening and ADMET properties using ACCORD Excel. Software tools for modeling bio-molecules.
UNIT V:
Immunoinformatics

REFERENCES
11. Immunoinforamtics by Novartis Foundation-Wiley Publication
Holy Cross College (Autonomous) Tiruchirappalli is a highly reputed Arts and Science College for Women in the state of Tamil Nadu. Situated at the heart of 'The Rock City™ on the banks of the River Cauvery, Holy Cross College has a unique history of academic excellence. It is a Catholic Institution established in 1923 when higher education for women was considered almost a transgression. It has been in the forefront of women™s education for 97 years and is marching towards the centenary. In keeping with its mission, the college admits a number of students from the socially and economically we Capability Enhancement Schemes. HRD. EDC(E-Cell). Examination Pattern. The UG Programme is for a period of three years and PG Programme for a period of two years. Each year will consist of two semesters™ viz. Odd and Even semesters. Odd semesters shall be from to June to October/November and Even semesters shall be from November / December to April / May. Credit refers to the weightage given to a course, usually in relation to the instructional hours and content of the course assigned to it. The total minimum credits, required for completing a UG Programme is 141 and PG Programme is 90. The details of credits for individual components and individual courses shall be obtained from the course structure of the syllabus provided to the students. Holy Cross College is situated in Tiruchirappalli in Tamil Nadu state of India. Established in 1923, it is accredited from NAAC and is affiliated to Bharathidasan University. HCC, Tiruchirappalli offers 51 courses across 10 streams namely Science, Paramedical, Arts, Commerce and Banking, IT, Medical, Media and Mass Communication, Management, Law, Education and across 14 degrees like BSc, BA, BBA, BCA, B.Com. Hostel facility is available for its students. Additional campus facilities such as Auditorium are also there. HCC Top Courses & Fees Holy Cross College Courses. BSc 10 Courses Offer Get detailed information about Holy Cross Home Science College Courses, Fees, Faculty, Infrastructure & Contact Details. Looking for a Specific Course? Select Course Bachelor of Commerce(B.Com.) Bachelor of Arts (BA) Bachelor of Science (B.Sc) Master of Science(M.Sc.) Popular Courses B.Com BA B.Sc M.Sc M.Sc View All. Courses Offered. 4.