(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>
<td>Major Core 2</td>
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<td>Principles and Practice of Technology Biotechnology</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, ttest, Correlation, null hypothesis, distribution. Use of computers in data analysis.

**REFERENCE BOOKS:**


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. Immunoinformatics by Novartis Foundation-Wiley Publication
Holy Cross College is an autonomous women's college located in Tiruchirappalli, Tamil Nadu, India. It has been recognized as the 'College with Potential for Excellence (CPE)' by the University Grants Commission. The college is ranked 66th among the colleges in India in the National Institutional Ranking Framework (NIRF) ranking of 2020. Holy Cross College was established in 1923 by the 'Sisters of the Cross of Chavanado', Province of Trichy. It became a second-grade college in 1928 and postgraduate Holy Cross College (Autonomous), Tiruchirappalli, Tamil Nadu Application Form, Admissions, Contact, Website, Map, B.Sc, BA, B.Com. 62 Courses. Average Fees is 28,980 per year. Content Curator. Holy Cross College Quick Update. July 16: Inviting applications for admission to various UG courses. Apply Here. Holy Cross College (Autonomous) is one of the most renowned colleges in Tamil Nadu, which is situated at the heart of 'The Rock City'. In addition, it offers certificate diploma, and PG diploma under varied specializations. Admission to all of these courses is based on the performances in the entrance test and interview conducted by the college. 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 Content varies from semester to semester with specific subject matter for each course announced just prior to enrollment. Designed for non-majors who wish to study mathematics other than calculus. This is the preferred course for students interested in taking just one mathematics course at the College. One unit. A large project extending over the course of the fourth year. It can consist of original research or be of an expository nature and is written under the guidance of one or more members of the department. Normally, a student will earn one unit in the spring semester of the fourth year for successful completion of an honors thesis, unless the thesis work is done as part of the student's participation in a departmental seminar. Holy Cross College, Tiruchirappalli. Established In: 1923 Affiliated To: Bharathidasan University Website: http://www.hcctrichy.ac.in Address: Teppakulam Post, P.B No. 318, Tiruchirappalli, Tamil Nadu 620020. Tel: 0431 270 0637. (4 out of 5 based on 16 Ratings). Rate this College. Holy Cross College, Tiruchirappalli is affiliated to the Bharathidasan University, has been in the forefront of women's education for nearly nine decades. Established in the year 1923, it is one among the oldest colleges for women in South India and aims to enable students to experience God as father and all mankind as brothers and sisters. NIRF Ranking 2020 - 66. Add On Courses. Admission to the institute is through single window counseling system of University of Calicut.