



GOVT.COLLEGEFORWOMENPARADEGROUND JAMMU

(Erstwhile Maharahi Mahila College) Estd 1944
(NAAC Re-ACCREDITED A GRADE)
Autonomous College under University of Jammu
College for Potential for Excellence(2016)

Pattern for Examination

Each Skill Course shall comprise of theory and practical components. These shall be referred as Skill Theory course and Skill Practical course.
Each course (Skill Theory and Skill Practical) shall be of two credits.

Skill theory course

Evaluation strategy

A) Internal assessment

1. Internal assessment (10 Marks) as per the adopted procedure for other courses.
2. No marks have been earmarked for attendance, however the eligibility criterion for appearing in the end semester examination shall remain the same as is followed in other courses.

B) External end semester Examination

1. Maximum Marks =40.
2. Question paper shall have three (A, B and C) sections
 - i) Section A shall comprise of 4 questions of 2 marks each.
 - ii) 2 questions shall be set from each unit of the prescribed course content.
 - iii) All questions shall be compulsory.
 - i) Section B shall comprise of 4 questions of 5 marks each
 - ii) 2 questions shall be set from each unit of the prescribed course content.
 - iii) All questions shall be compulsory.
 - i) Section C shall comprise of 3 questions of 12 marks each.
 - ii) 1.5 questions shall be set from each unit of the prescribed course content.
 - iii) Students shall be asked to attempt only one question of 12 marks from this section.

Skill Practical course

Evaluation strategy

A) Internal assessment

1. Internal assessment (25 Marks) as per the adopted procedure for other courses.
2. 5 marks have been earmarked for attendance, and the eligibility criterion for appearing in the end semester examination shall remain the same as is followed in other courses.

B) External end semester Examination

Maximum Marks =25.

Procedure of the external examination shall be same as is followed in other practical courses.

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SKILL ENHANCEMENT COURSE

Course Title: Bioinformatics I

Course Credits: 02+02

Objective of the course: To introduce the basics of computers, information technology and molecular concepts under dry lab conditions for the emancipation of Skill development in students of Life Sciences.

Learning Outcome:

- The course structure is designed so as to provide an in-depth knowledge of all the necessary concepts related to bioinformatics, be it biology, basic engineering, information technology, computer or soft skill development.
- During this course, a student has to attend various laboratory experiments which provide a practical application of the concepts taught in the classrooms.
- These labs are a supplement to the classroom programs of the semesters.

Semester-III

Bioinformatics I

Unit-I Basics of Computers

1. MS-WORD: Learning Word Basics – Formatting a Word Document – Working with Longer Document. MS-EXCEL: Creating a Simple Spreadsheet – Editing a Spreadsheet – Working with Functions and Formula – Formatting Worksheets – Completing Your Spreadsheet – Creating Charts.
2. MS-POWERPOINT: Creating and Viewing Presentations – Editing a Presentation – Working with Presentation Special Effects; Internet, World Wide Web, Browsers, Search Engines.

Unit-II Molecular Concepts and Introduction to Bioinformatics

1. Basic molecular concepts: Types of Nucleotide Sequence: Genomic DNA, Complementary DNA (cDNA), Recombinant DNA (rDNA), Expressed sequence tags (ESTs), Genomic survey sequences (GSSs). Human Genome Project and outcome.
2. Introduction to Bioinformatics-Definition, History and Scope. Biological Databases; Primary, Secondary & Composite databases and importance of databases. Applications of Bioinformatics and industries in India and Worldwide involved in computational data collection and storage.

PRACTICALS

1. MS Office: Creating, Formatting and editing a document.

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2. MS – EXCEL: Creating a work sheet, moving / copying / inserting / deleting rows and Columns. (Usage of cut, paste commands, copying a single cell, copying a range of data, filling up a cell. Undo command, inserting a row, column Deleting rows and columns.)

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3. Data base concept: Data base, Record field and field name – creating and sorting a data base and maintaining a data base (date form), Creating subtotals and grand totals.
 4. Creating charts (pie, Bar, Line).
 5. MS – POWER POINT: Creating a presentation, Different views in power point presentation Setting animation effects / grouping / ungrouping / cropping power/ point objects.
 6. To view and use the various biological databases available on the World Wide Web
 7. To explore the site of NCBI and PUBMED and to study the resources available on NCBI and PUBMED.

Books Recommended

1. Fundamentals of computers science and Communication Engineering. Alexis Leon & Mathews Leon, Vikas Publishing House Pvt. Ltd., New Delhi
2. Microsoft Office XP – fast & easy, DIANE KOERS Prentice Hall of India Private Limited, New Delhi
3. Dan E Krane and Michael L Raymer, fundamental concepts of bioinformatics, Pearson Education (low priced Edition)

Additional References

4. Lesk, Introduction to Bioinformatics, Oxford University Press, Indian Edition, 2013
5. JinXiong , Essential Bioinformatics-Cambridge University Press, Printed and bound in India by Replika Press Pvt.Ltd.

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SKILL ENHANCEMENT COURSE

Course Title: Bioinformatics II

Course Credits: 02+02

Objective of the course: To introduce the structure of Biomolecules and the Databases

Learning Outcome:

- Knowledge and awareness of the basic principles and concepts of biology and computer science.
- An understanding of the intersection of life and information sciences, the core of shared concepts, language and skills the ability to speak the language of database queries.

Semester-IV Bioinformatics II

Unit-I Structure of Nucleic Acids and Proteins

1. DNA and RNA; Base pairing- Watson crick; Types of double helices A,B,Z and their structural features; Types of RNA and their composition.
2. Hierarchical organization of protein structure- Primary, Secondary, Tertiary, Quaternary structure. Protein-DNA interactions.

Unit-2 Sequence Databases and Sequence Alignment Methods

1. Nucleotide Sequence Databases; GenBank, EMBL, DDBJ, NCBI Data Model. Protein Sequence Databases; SWISS-PROT, Translated EMBL (TrEMBL), UniProt, PROSITE, Pfam. Retrieval Systems: SRS, ENTREZ. NCBI Search.
2. Sequence alignment, Sequence Similarity Search: BLAST and FASTA, Pairwise sequence alignment: - Global and Local alignment, Multiple Sequence alignment (MSA):- Progressive and Iterative Methods , Eg:- Clustal W , Clustal X, Protein structure classification databases: SCOP and CATH, Human genome and diseases database – OMIM.

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Practicals

1. Queries based on biological databases
2. To retrieve a nucleotide sequence of interest from Genbank entry with Specific accession number.
3. To retrieve the nucleotide sequence of interest from the National Center for Biotechnology Information (NCBI) database.
4. To retrieve the structure of a protein from Protein Data Bank (PDB) database.
5. Sequence similarity searching using BLAST
6. Multiple Sequence Analysis
7. FASTA, ClustalW for multiple sequence alignment

Books Recommended

1. Bioinformatics- A Beginners Guide by Jean Michel Claverie, Cedric Notredame Wiley India Pvt. Ltd (Publisher)
2. Bioinformatics for Beginners – K.Mani and Vijayaraj. Kalaikathir Achagam
3. Fundamentals of Bioinformatics – Irfan Ali Khan, Atiya Khanum. Ukaaz publications.
4. Introduction to Bioinformatics - S.Sundararajan and Balaji
5. Bioinformatics basic methods and applications – S.C. Rastogi
6. Bioinformatics- Baxevanis AD and Quellerie BFF, John Wiley and sons Inc.

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