

ACHARYA NAGARJUNA UNIVERSITY

NAAC 'A' GRADE

REGISTRAR



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No.ANU/Acad./U.G/CBCS/III B.Sc/Bio-Inf /SEM-VI/Syllabus/2017

Date: 30-10-2017

PROCEEDINGS OF THE VICE-CHANCELLOR

Sub:- ANU – Academic –UG courses –CBCS – III year B.Sc Bio-Informatics
VI semester Syllabus - Approval - Orders – Issued.

Ref:- 1. Minutes of the meeting of the Board of Studies (UG) in Bioinformatics
held on 26-09-2017.

2. Vice-Chancellor's orders dated 26-10-2017.

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ORDER:-

The Vice-Chancellor, after having considered the minutes 1st cited, has approved the III year B.Sc Bioinformatics VI semester syllabus for the academic year 2017-18 prepared by the Board of Studies (UG) in Bioinformatics. The titles of the papers are mentioned below.

Semester-VI

1. Paper VII – Tools of Bioinformatics (Theory & Practical)
2. Paper VIII- Applications of Bioinformatics (Theory & Practical)

(BY ORDER)


JOINT REGISTRAR
Academic

To
The Chairman and all members, Board of Studies (UG) in Bioinformatics, ANU.
All the Principals of the Affiliated Colleges under ANU area.

Copy to:

The Dean, Faculty of Computer Science, ANU.

The Dean, CDC, ANU.

The Coordinator, UG (Exams), ANU

The Addl. Controller of Examinations, ANU.

The P.A. to Vice-Chancellor/ Registrar/Rector, ANU.

TOOLS OF BIOINFORMATICS - II

III YEAR - SEMESTER - VI

UNIT - I

Tools for Structure Prediction – Homology. Modelling – SWISS Model DaLi, Threading – J Pred and PHD. Neural Net, Protein interaction, Protein prediction from a DNA sequence, Sequence assembly.

H-M model

UNIT - II

Structure Predictions – Primary and Secondary Structure predictions. Motifs, Profile, patterns and finger prints. Methods of sequence base protein prediction, *Abinitio* approach for protein prediction. Methods of 2D structure predictions. Protein function prediction.

UNIT - III

RNA structure predictions – Introduction to RNA, RNA secondary structure, methodology of RNA Structure prediction. Non coding RNA prediction, RNA 3D prediction, modeling RNA molecules.

UNIT - IV

Software characteristics and applications – Gene finding, Gene scan and Grail, Global, PROCUSTES, MZEF, Clustal X and Clustal W.

UNIT - V

Applications – RASMOL, Oligo, Molscrip, Tree view, ALscript, V17, Genetic analysis software Phylip.

Practical - V

- 1) RNA Modelling
- 2) Similarity Vs. Homology studies
- 3) RASMOL
- 4) ALscript

Reference Books:

- 1) Fundamentals of Bioinformatics by S. Harsha, Harsha S.
- 2) Bioinformatics technologies by Yi-Ping Phoebe Chen (Ed.)
- 3) RNA 3D Structure Analysis and Predictions by Neocles Leontis Eric Westhof.

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26/9/2017

APPLICATIONS OF BIOINFORMATICS - II

III YEAR - SEMESTER - VI

UNIT - I

Proteins - Chemical properties of protein. Physical interactions that determine the property of proteins. Short-range interactions – Electrostatic forces. Van'der Waal interactions, Hydrogen bonds, Ionic bonds, Hydrophobic bonds. Proteins – Determination of sizes (Sedimentation analysis, gel filtration, SDS – PAGE); Native PAGE.

UNIT - II

Introduction to Proteomics – Primary, Secondary, tertiary and quaternary structures of proteins. Introduction to basic proteomics technology, Bioinformatic in proteomics.

UNIT - III

Gene to Protein function – a Roundtrip, Analysis of Proteomes, Analysis of 2-D gels, Sample preparation, Solubilization, reduction, resolution. Mass spectrometry based methods for protein identification.

UNIT - IV

Introduction to drug design, brief description of drugs, an overview of drug designing and discovery – NMR and IR. Chemo informatics tools for drug discovery – Chemical structure representation (SMILE & SMART). Chemical databases – CSD, ACD, WDI, Chem Bank, hazardous chemical database, PUBCHEM.

UNIT - V

Drug discovery and designing – target identification, target validation, lead identification, lead optimization, pharmacogenomics and pharmacogenetics.

Practical – VI

- 1) Proteomics 2D databases.
- 2) Proteome data base
- 3) Drug Discovery and Design
- 4) Chemical Structure representation

Reference Books:

- 1) Protein Structure Predictions A Practical Approach: A Practical Approach by Micheal JE Sternberg
- 2) Functional Genomics by Chris town.
- 3) Bioinformatic Methods and Applications Genomics, Proteomics and Drug Discovery, III Edition by S. C. Rastogi, N. Mendiratta, P. Rastogi.
- 4) Bioinformatics and Drug Discovery by Richard S Larson.
- 5) Bioinformatics Technologies by YiPing Phoeba Chen 2005.

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26/9/2017