



**VIGNAN'S**  
Foundation for Science, Technology & Research  
**UNIVERSITY**  
(Estd. u/s of UGC Act of 1956)

## DEPARTMENT OF BIOTECHNOLOGY

Date: 15.02.2015.

Minutes of Board of Studies (BOS) meeting of B.Tech Bioinformatics program held on 15-02-2015 at office Head of the department, Department of Biotechnology, Vignan's University, Vadlamudi.

### Agenda of the meeting:

1. To discuss and finalize structure and detailed syllabus for B.Tech Bioinformatics program applicable from 2014-15 admitted batch

### Members present:

| S.No | Name                                                           | Members         | Signature |
|------|----------------------------------------------------------------|-----------------|-----------|
| 1.   | Prof. S. Krupanidhi, HOD<br>Department of Biotechnology        | Chairman, BOS   |           |
| 2.   | Prof. Chanchal K Mitra<br>University of Hyderabad<br>Hyderabad | Invited member  |           |
| 3.   | Mr. G.V. Subba Rao, Reliance<br>Life Science, Hyderabad        | Invited member  |           |
| 4.   | Prof. R Venkata. Nadh,                                         | Internal Member |           |
| 5.   | Dr. D. Vijaya Ramu, Associate<br>Professor                     | Internal Member |           |
| 6.   | Mrs. M. Indira, Assistant<br>Professor                         | Internal Member |           |
| 7.   | Mr.D.John Babu, Assistant<br>Professor                         | Internal Member |           |
| 8.   | Mr.A. Venkata Narayana,<br>Assistant Professor                 | Internal Member |           |

### **Minutes of the BOS meeting**

1. The chairman welcomed all the members of BOS.
2. The chairman highlighted broad objectives of the proposed changes in the course structure of B.Tech Bioinformatics.
3. The chairmen also explained in detail the suggestions and comments communicated various stakeholders.
4. The members of the BOS thoroughly looked at the proposals of Department of Biotechnology in the light of suggestions made by experts and recommended a new course structure for B.Tech Bioinformatics program.

#### **After the discussion it is resolved to:**

1. Propose and approve course structure for all 4 years of B.Tech. Programme in Bioinformatics (Appendix-I).
2. Propose and approve detailed syllabus for the 4 year of B.Tech. Programme in Bioinformatics with effect from the academic year 2014-15. The proposed structure and syllabus are applicable for 2014 admitted batch onwards.
3. Stakeholder's feedback is collected, analyzed and given utmost priority while designing the curriculum and their suggestions are implemented
4. The curriculum follows choice-based credit system
5. The significant attraction of this curriculum is introduction of minor specializations such as Management, Humanities & Science, Information Technology and Electronics and Communication Engineering
6. Another important feature of this curriculum is introduction of new electives such as Codon Evolution and Temporal dynamics, Next Generation sequencing & Analysis, Eco Informatics & Predictive Ecology, Computational Epigenetics, etc.
7. The curriculum is encompassing the courses that enable employability or entrepreneurship or skill development (Appendix II)
8. In the B.Tech. Bioinformatics revised regulation R13, the substantial changes are made in the content of all courses and hence the courses are considered as new courses (Appendix III)

## Appendix-I Course Structure

### I Year I Semester

| Subject                                | L         | T        | P        | To        | C         |
|----------------------------------------|-----------|----------|----------|-----------|-----------|
| Mathematics for Biotechnologists-I     | 4         | -        | -        | 4         | 4         |
| Engineering Physics                    | 4         | -        | -        | 4         | 4         |
| Engineering Mechanics                  | 4         | -        | -        | 4         | 4         |
| Technical English Communication        | 3         | 2        | -        | 5         | 5         |
| Problem Solving & Computer Programming | 5         | -        | -        | 5         | 5         |
| Network Security                       | 2         | -        | -        | 2         | -         |
| <b>Practical Course:</b>               |           |          |          |           |           |
| Computer Programming Lab               | -         | -        | 3        | 3         | 2         |
| Workshop Practice                      | -         | -        | 3        | 3         | 2         |
| Engineering Physics Lab                | -         | -        | 3        | 3         | 2         |
|                                        | <b>22</b> | <b>2</b> | <b>9</b> | <b>33</b> | <b>28</b> |

### I Year II Semester

| Subject                                   | L         | T        | P        | To        | C         |
|-------------------------------------------|-----------|----------|----------|-----------|-----------|
| Mathematics for Biotechnologists-II       | 4         | -        | -        | 4         | 4         |
| Environmental Studies                     | 3         | -        | -        | 3         | 3         |
| Fundamental of Electrical Engineering     | 4         | -        | -        | 4         | 4         |
| Engineering Chemistry                     | 4         | -        | -        | 4         | 4         |
| Elements of Biology & Biotechnology       | 4         | -        | -        | 4         | 4         |
| Professional Ethics Values & Human Rights | 2         | -        | -        | 2         | -         |
| <b>Practical Course:</b>                  |           |          |          |           |           |
| Engineering Chemistry Lab                 | -         | -        | 3        | 3         | 2         |
| Engineering Graphics                      | 1         | -        | 3        | 4         | 3         |
| Fundamental of Electrical Engg. Lab       | -         | -        | 3        | 3         | 2         |
| <b>TOTAL</b>                              | <b>22</b> | <b>-</b> | <b>9</b> | <b>31</b> | <b>26</b> |

## II Year I Semester

| Subject                                 | L         | T | P        | To        | C         |
|-----------------------------------------|-----------|---|----------|-----------|-----------|
| Cell Biology & Microbiology             | 4         | - | -        | 4         | 4         |
| Biochemistry                            | 4         | - | -        | 4         | 4         |
| Bioinformatics networks and Application | 4         | - | -        | 4         | 4         |
| Biodiversity and Conservation           | 4         | - | -        | 4         | 4         |
| Probability & Statistics                | 4         | - | -        | 4         | 4         |
| Seminar                                 |           | - | -        | 1         | 1         |
| <b>Minor - I</b>                        | 4         | - | -        | 4         | 4         |
| <b>Practical Course:</b>                |           |   |          |           |           |
| Microbiology Lab                        | -         | - | 3        | 3         | 2         |
| Biochemistry Lab                        | -         | - | 3        | 3         | 2         |
| Soft Skills Lab                         | -         | - | 3        | 3         | 2         |
|                                         | <b>24</b> | - | <b>9</b> | <b>34</b> | <b>31</b> |

## II Year II Semester

| Subject                              | L         | T | P        | To        | C         |
|--------------------------------------|-----------|---|----------|-----------|-----------|
| Data Structures                      | 4         | - | -        | 4         | 4         |
| Genetics                             | 4         | - | -        | 4         | 4         |
| Molecular Biology                    | 4         | - | -        | 4         | 4         |
| Introduction to Biological Databases | 4         | - | -        | 4         | 4         |
| Molecular Phylogeography             | 4         | - | -        | 4         | 4         |
| Seminar                              |           | - | 1        | 1         | 1         |
| <b>Minor - II</b>                    | 4         | - | -        | 4         | 4         |
| <b>Practical Course:</b>             |           |   |          |           |           |
| Data Structures Lab                  | -         | - | 3        | 3         | 2         |
| Biological Database Lab              | -         | - | 3        | 3         | 2         |
| Professional Communication Lab       | 1         | - | 2        | 3         | 2         |
|                                      | <b>25</b> | - | <b>9</b> | <b>34</b> | <b>31</b> |

### III Year I Semester

| Subject                                  | L  | T | P  | To | C  |
|------------------------------------------|----|---|----|----|----|
| Molecular Evolution & Phylogenetic trees | 4  | - | -  | 4  | 4  |
| Object Oriented Programming through JAVA | 4  | - | -  | 4  | 4  |
| Script Programming                       | 4  | - | -  | 4  | 4  |
| Managerial Economics                     | 4  | - | -  | 4  | 4  |
| Herbal Biotechnology (Elective-I)        | 4  | - | -  | 4  | 4  |
| Natural Selection (Elective-I)           |    | - | -  | -  | -  |
| Plant Biotechnology (Elective-I)         |    | - | -  | -  | -  |
| Minor - III                              | 4  | - | -  | 4  | 4  |
| Seminar                                  |    | - | 1  | 1  | 1  |
| <b>Practical Course:</b>                 |    |   |    |    |    |
| Object Oriented Programming Lab          | -  | - | 3  | 3  | 2  |
| Script Programming Lab                   | -  | - | 3  | 3  | 2  |
| Construction of Phylogenetic Trees Lab   | -  | - | 3  | 3  | 2  |
|                                          | 24 | - | 10 | 34 | 31 |

### III Year II Semester

| Subject                                             | L  | T | P  | To | C  |
|-----------------------------------------------------|----|---|----|----|----|
| Database Systems                                    | 4  | - | -  | 4  | 4  |
| Genetic Engineering & Epigenetics                   | 4  | - | -  | 4  | 4  |
| Biomedical informatics                              | 4  | - | -  | 4  | 4  |
| Unix Programming                                    | 4  | - | -  | 4  | 4  |
| Ethnobotany Genomics (Elective-II)                  | 4  | - | -  | 4  | 4  |
| Codon Evolution and Temporal dynamics (Elective-II) | -  | - | -  | -  | -  |
| Animal Biotechnology (Elective-II)                  | -  | - | -  | -  | -  |
| Minor - IV                                          | 4  | - | -  | 4  | 4  |
| Seminar                                             | -  | - | 1  | 1  | 1  |
| <b>Practical Course:</b>                            |    |   |    |    |    |
| Database System Lab                                 | -  | - | 3  | 3  | 2  |
| Unix Programming Lab                                | -  | - | 3  | 3  | 2  |
| Mini Project Lab                                    | -  | - | 3  | 3  | 2  |
| TOTAL                                               | 24 | - | 10 | 34 | 31 |

### IV Year I Semester

| Subject | L | T | P | To | C |
|---------|---|---|---|----|---|
|---------|---|---|---|----|---|

|                                       |    |   |   |    |    |
|---------------------------------------|----|---|---|----|----|
| Molecular Modeling & Drug Design      | 4  | - | - | 4  | 4  |
| R - Statistics                        | 4  | - | - | 4  | 4  |
| Immunology & Immunoinformatics        | 4  | - | - | 4  | 4  |
| Structural Bioinformatics             | 4  | - | - | 4  | 4  |
| <b>Elective - III</b>                 | 4  | - | - | 4  | 4  |
| Population Genetics                   |    |   |   |    |    |
| Proteomics and Genomics               |    |   |   |    |    |
| Bioethics Safety & IPR                |    |   |   |    |    |
| <b>Elective - IV</b>                  | 4  | - | - | 4  | 4  |
| Forensic Science                      |    |   |   |    |    |
| Next Generation Sequencing & Analysis |    |   |   |    |    |
| Biopharmaceutical Technology          |    |   |   |    |    |
| <b>Practical Course</b>               |    |   |   |    |    |
| Immunoinformatics Lab                 | -  | - | 3 | 3  | 2  |
| R - Statistics Lab                    | -  | - | 3 | 3  | 2  |
| Molecular Modeling Lab                | -  | - | 3 | 3  | 2  |
|                                       | 24 | - | 9 | 33 | 30 |

#### IV Year II Semester

| Subject                              | L  | T | P  | To | C  |
|--------------------------------------|----|---|----|----|----|
| <b>Minor - V</b>                     | 4  | - | -  | 4  | 4  |
| <b>Elective - V</b>                  | 4  | - | -  | 4  | 4  |
| Eco Informatics & Predictive Ecology |    |   |    |    |    |
| Computational Epigenetics            |    |   |    |    |    |
| Metabolic Engineering                |    |   |    |    |    |
| <b>Elective - VI</b>                 | 4  | - | -  | 4  | 4  |
| Molecular Forensics                  |    |   |    |    |    |
| Comparative Genomics                 |    |   |    |    |    |
| Biosensors and Bioelectronics        |    |   |    |    |    |
| Project work                         | -  | - | 20 | 20 | 10 |
| <b>TOTAL</b>                         | 12 | - | 20 | 32 | 22 |

#### II Semester

| Subject               | L | T | P  | To | C  |
|-----------------------|---|---|----|----|----|
| Internship (6 months) | - | - | 36 | 36 | 18 |
| <b>TOTAL</b>          | - | - | 36 | 36 | 18 |

The courses that are highlighted denote implementation of 'Choice Based Credit System (CBCS)'



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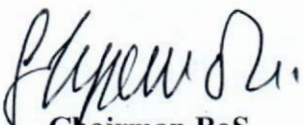
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**APPENDIX - II**

**List of courses that enable employability or entrepreneurship or skill development in the R-13 B.Tech – Bioinformatics**

| S.No | Year | Course Name                                 | Employability/<br>Entrepreneurship/ Skill<br>development |
|------|------|---------------------------------------------|----------------------------------------------------------|
| 1.   | II   | Cell Biology & Microbiology                 | Employability                                            |
| 2.   | II   | Introduction to Biological Databases        | Skill development                                        |
| 3.   | II   | Biochemistry                                | Skill development                                        |
| 4.   | II   | Molecular Phylogeography                    | Skill development                                        |
| 5.   | II   | Bioinformatics networks and<br>Application  | Skill development                                        |
| 6.   | II   | Biological Database Lab                     | Employability                                            |
| 7.   | II   | Biodiversity and Conservation               | Skill development                                        |
| 8.   | II   | Microbiology Lab                            | Skill development                                        |
| 9.   | II   | Biochemistry Lab                            | Skill development                                        |
| 10.  | III  | Molecular Evolution & Phylogenetic<br>Trees | Skill development                                        |
| 11.  | III  | Genetic Engineering & Epigenetics           | Skill development                                        |
| 12.  | III  | Herbal Biotechnology                        | Skill development                                        |
| 13.  | III  | Ethnobotany Genomics                        | Skill development                                        |
| 14.  | III  | Natural Selection                           | Skill development                                        |
| 15.  | III  | Codon Evaluation and Temporal<br>Dynamics   | Employability                                            |
| 16.  | III  | Construction of Phylogenetic Trees<br>Lab   | Employability                                            |
| 17.  | III  | Biomedical Informatics                      | Skill development                                        |

| S.No | Year | Course Name                           | Employability/ Entrepreneurship/ Skill development |
|------|------|---------------------------------------|----------------------------------------------------|
| 18.  | III  | Unix Programming                      | Skill development                                  |
| 19.  | III  | Unix Programming Lab                  | Skill development                                  |
| 20.  | III  | Mini Project Lab                      | Skill development                                  |
| 21.  | IV   | Molecular Modelling & Drug Design     | Skill development                                  |
| 22.  | IV   | Eco informatics & Predictive Ecology  | Skill development                                  |
| 23.  | IV   | r-Statistics                          | Skill development                                  |
| 24.  | IV   | Computational Epigenetics             | Skill development                                  |
| 25.  | IV   | Immunology & immunoinformatics        | Skill development                                  |
| 26.  | IV   | Metabolic Engineering                 | Employability                                      |
| 27.  | IV   | Population Genetics                   | Skill development                                  |
| 28.  | IV   | Molecular forensics                   | Employability                                      |
| 29.  | IV   | Proteomics & Genomics                 | Skill development                                  |
| 30.  | IV   | Comparative Genomics                  | Employability                                      |
| 31.  | IV   | forensic Science                      | Employability                                      |
| 32.  | IV   | Project                               | Skill development                                  |
| 33.  | IV   | Next Generation Sequencing & Analysis | Employability                                      |
| 34.  | IV   | Internship                            | Skill development                                  |
| 35.  | IV   | Structural Bioinformatics             | Skill development                                  |
| 36.  | IV   | Immunoinformatics Lab                 | Skill development                                  |
| 37.  | IV   | r-Statistics Lab                      | Skill development                                  |
| 38.  | IV   | Molecular Modelling Lab               | Skill development                                  |

  
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**APPENDIX - III**

**List of new courses in the R-13**  
**B.Tech – Bioinformatics Curriculum**

| S.No | Year | Course Name                              |
|------|------|------------------------------------------|
| 1.   | II   | Cell Biology & Microbiology              |
| 2.   | II   | Introduction to Biological Databases     |
| 3.   | II   | Biochemistry                             |
| 4.   | II   | Molecular Phylogeography                 |
| 5.   | II   | Bioinformatics networks and Application  |
| 6.   | II   | Biological Database Lab                  |
| 7.   | II   | Biodiversity and Conservation            |
| 8.   | II   | Microbiology Lab                         |
| 9.   | II   | Biochemistry Lab                         |
| 10.  | III  | Molecular Evolution & Phylogenetic Trees |
| 11.  | III  | Genetic Engineering & Epigenetics        |
| 12.  | III  | Herbal Biotechnology                     |
| 13.  | III  | Ethnobotany Genomics                     |
| 14.  | III  | Natural Selection                        |
| 15.  | III  | Codon Evalution and Temporal Dynamics    |
| 16.  | III  | Construction of Phylogenetic Trees Lab   |
| 17.  | III  | Biomedical Informatics                   |
| 18.  | III  | Unix Programming                         |
| 19.  | III  | Unix Programming Lab                     |
| 20.  | III  | Mini Project Lab                         |
| 21.  | IV   | Molecular Modelling & Drug Design        |
| 22.  | IV   | Eco informatics & Predictive Ecology     |
| 23.  | IV   | r-Statistics                             |

| S.No | Year | Course Name                           |
|------|------|---------------------------------------|
| 24.  | IV   | Computational Epigenetics             |
| 25.  | IV   | immunology & immunoinformatics        |
| 26.  | IV   | Metabolic Engineering                 |
| 27.  | IV   | Population Genetics                   |
| 28.  | IV   | Molecular forensics                   |
| 29.  | IV   | Proteomics & Genomics                 |
| 30.  | IV   | Comparative Genomics                  |
| 31.  | IV   | forensic Science                      |
| 32.  | IV   | Project                               |
| 33.  | IV   | Next Generation Sequencing & Analysis |
| 34.  | IV   | Internship                            |
| 35.  | IV   | Structural Bioinformatics             |
| 36.  | IV   | immunoinformatics Lab                 |
| 37.  | IV   | r-Statistics Lab                      |
| 38.  | IV   | Molecular Modelling Lab               |

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Chairman BoS