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No. 75

KARPAGAM ACADEMY OF HIGHER EDUCATION
COIMBATORE – 641 021

Minutes of the meeting of the **Board of Studies in Biotechnology** held on **June 12, 2018 at 10.00 am** in the **Department of Biotechnology, FASH** at Karpagam Academy of Higher Education.

Members Present:

1. **Dr. Prabu, G.R.,**
Associate Professor & Head (i/c), Department of Biotechnology,
Faculty of Arts, Science and Humanities,
Karpagam Academy of Higher Eductaion, Coimbatore – 641 021
2. **Dr. R. Thilagavathy,**
Associate Professor & Head (i/c), Department of Biotechnology,
Faculty of Engineering,
Karpagam Academy of Higher Eductaion, Coimbatore – 641 021
3. **Dr. R. Usha,**
Associate Professor, Department of Microbiology, FASH,
Karpagam Academy of Higher Eductaion, Coimbatore – 641 021
4. **Dr. A. Sangilimuthu,**
Department of Biotechnology, KAHE, Coimbatore – 641 021
5. **Dr. P. Rajiv,**
Department of Biotechnology, KAHE, Coimbatore – 641 021
6. **Dr. A. Gnanamani,**
Principal Scientist, Biological Material Laboratory,
CSIR – Central Leather Research Institute, Adyar, Chennai
7. **Dr. A. Balamurugan,**
Manager, Field Research & Product Promotion – Exports,
Research & Development – Agri, T. Stanes Company Limited,
8/23-24, Race Course Road, Coimbatore – 641 018

The Chairperson welcomed the members of the Board. Leave of absence granted to Dr. A. Balamurugan. The Board carefully scrutinized the draft syllabus / syllabi and after detailed discussion the following resolutions were passed.

Agenda: 1

1. To consider and approve the Regulations and Syllabus for **UG (B.Sc., Biotechnology)** programme (**First and Second Semester**).

Resolution: 1

1. Resolved to amend the corrections/ modifications and approve the Regulations and Syllabus for **UG (B.Sc., Biotechnology)** programme and it comes into effect from **2018-19** (Approved Regulations and Syllabus given in **Annexure-I**).

Agenda: 2

1. To consider and approve the Regulations and Syllabus for **PG (M.Sc., Biotechnology)** programme.

Resolution: 2

1. Resolved to amend the corrections/ modifications and approve the Regulations and Syllabus for **PG (M.Sc., Biotechnology)** programme and it comes into effect from **2018-19** (Approved Regulations and Syllabus given in **Annexure-II**).

Agenda: 3

1. To consider and approve the Regulations and Syllabus for **M.Phil/Ph.D., Biotechnology** programme.

Resolution: 3

1. Resolved to approve the Regulations and Syllabus for **M.Phil/Ph.D., Biotechnology** programme and it comes into effect from **2018-19** (Approved Regulations and Syllabus given in **Annexure-III**).

Annexure – I**B.Sc (Biotechnology)**

The following corrections and suggestions is included in **B.Sc (Biotechnology)** syllabus (2018-19)

The expert members have suggested to include the following aspects in the curriculum

In regard to the syllabus for **B.Sc., Biotechnology** programme, **no corrections** have been suggested to include and also suggested to follow the previous year (2017-18) syllabus of **B.Sc., Biotechnology** programme for the academic year 2018-19.

The changes made in the syllabus will impart better understanding in the aspect of core biotechnology modules, function to develop students with better entrepreneurship ability.

Semester – III

I.P.R., Entrepreneurship, Bioethics & Biosafety (18BTU304A)

- Addition of the topic, ISI levels in unit V.

Bio- Analytical Tool (18BTU304B)

- Inclusion of the topics, HPTLC, MS, GC-MS, and LC-MS in unit III.
- Inclusion of 2D- gel electrophoresis in unit IV.
- In unit V, inclusion of Biosensors, Biochips, Microarray topics
- In unit V, removal of the topic - Introduction to Biosensors and Nanotechnology and their applications.

Molecular Biology Practical (18BTU312)

- Addition of the topic, Preparation of buffers and solution in Experiment No. 1.

Semester – IV

Recombinant DNA Technology (18BTU402)

- Change of the topic as vector types in unit I.
- Inclusion of Role of Embryonic Stem cells in gene targeting in mice at Unit V.

Industrial Fermentation (18BTU404A)

- Change of the Unit I title as Introduction to industrial fermentations instead Microbial products.
- Inclusion of Primary metabolism – its significance and products.
- Removal of Over production of microbial metabolite
- Re- ordered the units IV as Unit III and Unit III as IV for clear teaching and learning.

Enzymology (18BTU404B)

- Change of unit V title as Applications of Enzyme Technology.

Bioprocess Technology Practical (18BTU411)

- Addition of the topic, Isolation of industrially important microorganism from natural resources as Experiment No. 1.

Industrial Fermentation Practical (18BTU414A)

Inclusion of the following experiments along with the other experiments

- Immobilization of bacteria and enzymes.
- Production of Butanol from biomass.
- Production of any one microbial flavours.
- Biogas/biohydrogen production from waste biomass.

Enzymology Practical (18BTU414B)

Addition of the following experiments

- Preparation of buffer and matrix to separate enzyme from natural resource.
- Enzyme zymography amylase / protease.

Semester – V

Basics of Forensic Science (18BTU501B)

- In Unit V: Addition of the topic, Cyber Crime

Bioinformatics (18BTU502A)

- **Re-arrangement of the unit I content as** Introduction to Bioinformatics – History and Milestones. Data sequence sources- NCBI, EMBL, GenBank, Entrez, UNIGENE. Human genome project.

Animal Biotechnology (18BTU504A)

- In unit III – Inclusion of the topic, Gene Gun
- In Unit V – Addition of the topics, Introduction to transgenesis. Transgenic Animals – Mice, Cow, Pig, Sheep, Goat, Bird, Insect. Zebra Fish to be included.

Evolutionary Biology Practical (18BTU513B) -

- Inclusion of Phylogeny as experiment.

Semester – VI

Molecular Diagnostics (18BTU601A)

- Unit V - Change of the unit title as Application
- Inclusion of the following contents: PCR, reverse transcriptase PCR, fluorescence microscopy, Hybridization methods like Southern, Northern blotting, FISH, DNA and RNA fingerprinting in Unit V.

Biotechnology and Human Welfare (19BTU601B)

- In unit I, Change of the title as Introduction
- Inclusion of the topics, Fermentation, Types of fermentation, Downstreaming processing, fermented foods in Unit I
- Unit II, Addition of the topics, Insect resistance, Drought resistance, Biofertilizers, Biopesticide and Biocontrol agents
- In Unit V, change of the unit title changed as Medical Biotechnology
- Inclusion of the following contents, Types of gene therapy, Stem cell technology, Targeted gene therapy, ethical issues, diagnostics in Unit V.

Medical Microbiology (18BTU602A)

- Addition of the following contents
- Bacterial infection, Medical importance of salmonellosis, Shidellosis in Unit II.
- Unit III – addition of Reoviruses, Adenoviruses.

Environmental Biotechnology (18BTU602B)

In UNIT- II: Inclusion of the following contents

- Aerobic and anaerobic treatments of SWM, Composting, Vermicomposting, Biogas production, Treatment of Hazardous waste, treatment strategies of PCBP.
- Biomedical wastes, Types of biomedical waste, Hazards caused by Biomedical waste,
- Treatment strategies of Biomedical waste.

BIOSTATISTICS (18BTU603A)

- Inclusion of Statistical software R or SAS and its implementation in Unit V.

Environment Management (18BTU603B)

- Addition of Environment impact assessment in Unit III.
- Unit IV – Inclusion of Biotechnological aspects of pollutant management.
- Unit V – Inclusion of Disaster management and Industrial safety and its product management

Molecular Diagnostics Practical (18BTU611A)

- Inclusion of PCR as demonstration experiment as Experiment No. 6.

Medical Microbiology Practical (18BTU612A)

- Addition of Hanging drop method as experiment No. 6.

In all the subjects, members have suggested to include the new editions of the references, text books and also to include available web links, e-learning resources.

The above suggested contents impart knowledge and train the students to meet with the need of current biotechnology and allied field industries.

The UG programme, B.Sc., Biotechnology consists of 65 courses, out of which four are language and general courses. The total changes is in 21 courses $21/65 \times 100 = 32.30\%$

Annexure – II

M.Sc (Biotechnology)

The following corrections and suggestions is included in M.Sc (Biotechnology) syllabus (2018-19)

The expert members have suggested to include the following aspects in the curriculum and syllabus by matching with the current need of improvement and also the syllabus of all India level competitive examinations.

In regard to the syllabus for **M.Sc., Biotechnology** programme for the academic year 2018-2019 (III, IV semesters) and for the academic year 2019-2020, panel members have suggested the following suggestions and corrections to include in the curriculum and syllabus.

Semester – I

- Change of Bioinstrumentation and Biostatistics (18BTP104) subject as core course instead of on elective paper
- Inclusion of Ecology, Evolutionary and Developmental Biology (18BTP103) subject as core subject
- Merging the two basic subjects, Biochemistry, Microbiology (18BTP101) into one course – Biochemistry and Microbiology and respective change of practical subject to match with the theory.
- Change of Biosafety and IPR (18BTP105A) as elective subject from second semester to first semester in order to make the students in understanding the necessity and importance of safety aspects during the laboratory usage and the protection of scientific knowledge by IPR.
- Change to offer the Food Biotechnology subject from first semester to third semester.

Semester – II

- In order to provide the theoretical concepts of downstream processing, the Bioprocess Technology subject content has to be included in Fermentation Technology and renaming of the subject as Fermentation and Bioprocess Technology (18BTP202).
- Inclusion of the Enzyme Technology (18BTP203) subject to meet the need of industrial aspects.
- Inclusion of Agricultural Biotechnology (18BTP205B) as elective paper to impart the role of biotechnology in agriculture field.
- Change of Environmental Biotechnology (18BTP304) from second semester to third semester.
- Recombinant DNA technology (18BTP201) may leads to industrial production through fermentation process. Thus, the practical subjects are revised and included the fermentation and downstream processing techniques in addition to rDNA techniques and suggested as Recombinant DNA, Fermentation and Bioprocess Technology Practical.

- Most of the enzymes are used as catalyst in immune aspects and techniques, suggested to include Immuno- and Enzyme Technology Practical subject (18BTP212)
- The above suggested practical's impart knowledge and train the students to meet need of trained manpower in the current biotechnology and allied field industries.

Semester – III

- Merging the two subjects, Plant Biotechnology and Animal Biotechnology into one subject as new course Plant and Animal Biotechnology (18BTP301) and respective change of practical subject to match with the theory.
- Merging of the two subjects, Bioinformatics and Genomics and Proteomics into one subject as new course Genomics, Proteomics and Bioinformatics (18BTP302) and respective change of practical subject to match with the theory in order to make the students in understanding the necessity and importance of the interlinked usage of the bioinformatics aspects in genomics and proteomics.
- Inclusion of Applied Biotechnology (18BTP305A) as elective subject in order to provide the importance of the biotechnology applications in all other allied fields.
- Inclusion of new course Tissue Engineering and Regenerative medicine (18BTP305C) as elective subject in order to provide the fundamental concepts in tissue engineering and regenerative medicine which can be used for subsequent employment in biomedical and clinical research environments.
- Change of the course contents in order to provide extensive knowledge in the elective subject, Tissue Engineering and Regenerative medicine.

Plant and Animal Biotechnology (18BTP301)

- In Unit IV – removal of the topic, Stem cell research

Food Biotechnology (18BTP303)

- Re-arrangement of the Unit IV and V as Unit V, and IV respectively.
- Inclusion of adulteration topic in Unit V and re-arrangement of the unit contents for proper understanding of the topics. Sensors used for analysis to be added.
- Inclusion of the topic, Detection systems and sensors in Unit V.
- Inclusion of FSSAI guideline in Unit V in order to provide the regulations of food safety to students.

Environmental Biotechnology (18BTP304)

- Re-arrangement to the Unit 1 contents as mentioned: Ecosystem – Concept and management of ecosystems. Energy budget. Energy Transfer and energy pyramids. Environmental pollution and its problems- Air, water, soil. Biogeochemical cycle (Carbon, nitrogen and phosphorous cycle). Response of plant, animal and microbes to external factors
- Inclusion of the topic, Bioleaching in Unit II

- In Unit V - Addition of the topic, Biodiesel, Microbial Fuel Cell, Sustainability, Maintenance and Swatch Bharat aspects in environmental biotechnology.

In all the subjects, members have suggested to include the new editions of the references, text books and also to include available web links, e-learning resources.

The PG programme, M.Sc., Biotechnology (I & II semester) consists of 18 courses. There is a syllabi change in five courses and hence total change $12/18 \times 100 = 66.67\%$.

Annexure – III

M.Phil/Ph.D., Biotechnology

In regard to the syllabus for **M.Phil/Ph.D., Biotechnology** programme, the following improvements have been suggested to include

- Addition of new subjects in Paper III subjects
Food Technology
Structural Biology
- Suggested to include topic “FASSI” in Food Technology subject.
- **no corrections** have been suggested in other subjects and also suggested to follow the previous year (2017-18) syllabus of **M.Phil/Ph.D., Biotechnology** programme for the academic year 2018-19.

The M.Phil/Ph.D programme in Biotechnology consists of 10 courses. There is an addition of two new courses and hence total change $2/10 \times 100 = 20\%$.

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