



- BT 2281: Summer Training / Project to be offered with 05 (Five) credits in place of 10 (Ten) credits
- BT 2481: Project/ Dissertation to be offered with 10 (Ten) credits in place of 05 (Five) credits.

This is applicable for the students admitted from academic year 2016-17.

#### **17AC (D-4-2) B Sc Botany (Core and Subsidiary):**

The Council approved the syllabi and replacement of Applied Botany [BY1602] with Ethnobotany [BY1603]. This will be effective from academic year 2017-18.

#### **17AC (D-5) FACULTY OF ARTS & LAW**

##### **17AC (D-5-1) Scheme & Syllabi of Bachelor of Physical Education & Sports:**

The Council approved the Scheme & Syllabi of I & II semesters of Bachelor of Physical Education & Sports (BPES) with the suggestion to change some of the course nomenclatures in the proposed scheme. The Council further directed to resubmit the revised scheme to the Chairman, Academic Council for consideration.

This will be offered from academic year 2017-18.

##### **17AC (D-5-2) Scheme of MA (Applied Economics):**

The Council approved the Scheme of I & II semesters of MA (Applied Economics). This will be effective from academic year 2017-18.

The Council further suggested that the eligibility criteria be identified clearly for admissions in MA (Applied Economics) and be submitted to Chairman, Academic Council for special approval.

##### **17AC (D-5-3) One year PG Diploma Programme in Theater Arts:**

The Council approved offering of one year PG Diploma Programme in Theater Arts by Department of Journalism & Mass Communication. This will be effective from academic year 2017-18.

The Council also approved the scheme and syllabi of the programme with suggestion to reframe the objective and outcome of the programme.

Director SMC was requested to submit a note on the said programme considering regulatory framework.





**Date:** December 05, 2016

**Chairman:** Dr. M. M. Sharma, Head Department of Biosciences

Meeting of the Board of Studies in the Department of Biosciences was held on 05<sup>th</sup> Dec.2016, at Manipal University Jaipur to approve the syllabi of the M.Sc. Biotechnology III & IV semester (regular) and to revise the syllabi of B.Sc. (pass) Botany. External expert discussed the syllabi of M.Sc. Biotechnology III & IV semester and B.Sc. (pass) Botany at her residence and suggested some modifications. The following members were present in the meeting:

1.	Prof. Meenakshi Sharma	Professor, Department of Botany, UOR, Jaipur	External Expert
2.	Prof. V.S. Kulhar	Professor, Dept. of Physics	Member from other department
3.	Dr. Vandana Suhag	Ex officio Member	Registrar, MUJ
4.	Dr. Madan Mohan Sharma	Chairman	Head, Department of Biosciences, MUJ
5.	Dr. Abhijeet Singh	Member	Associate Professor, Department of Bioscience, MUJ
6.	Dr. Sandeep Kumar Srivastava	Member	Associate Professor, Department of Bioscience, MUJ
7.	Dr. Rohit Jain	Member	Assistant Professor, Department of Bioscience, MUJ

The proposed scheme and syllabi were discussed and the following changes were suggested and approved:

1. **M.Sc. Biotechnology III & IV** semester syllabi was approved with following modifications
  - (i) The syllabus has to be in line with the CSIR-NET Life Science examination.
  - (ii) Mathematics for biologist paper (MA 2301) should be discussed with some expert of the Bio-mathematics field.
  - (iii) For the paper Bioethics, Biosafety and Intellectual Property Rights (BT 2454) consult with some expert and different University syllabus.

2. **B.Sc. Botany (Core/Subsidiary course):**

- (i) Following modifications were approved from 2017-18 batch onwards.

Course Name(Removed)	Course Name(Introduced)
Applied Botany (BY 1602)	Economic Botany & Ethnobotany (BY 1603)

As per the suggestions of the external expert following topics were added in the Botany course (Core/Subsidiary):

- (ii) **Diversity of Cryptogames and Microbes (BY 1101):** Life cycle of *Lycopodium*
- (iii) **Mycology, Plant Pathology and Lichenology (BY 1201):** Root Knot disease, Little leaf disease of brinjal, tobacco mosaic disease, integrated pest management, role of information technology in disease control

*M Sharma*



- (iv) **Morphology and Angiosperms and Angiosperms (BY 1401):** Korper-kappe theory, vascular tissue differentiation.
- (v) **Plant Physiology BY 1501:** Phases of growth development, Biological clock (Circadian rhythm) and its regulation.
- (vi) **Botany Laboratory-V (BY 1531):** Estimation of mineral nutrients in plant ash.
- (vii) **Plant Breeding (BY 1502):** Centers of origin of cultivated and food plants, Germplasm conservation, plant introduction, Methods of plant breeding in self and cross pollinated crops, The Hardy-Weinberg Law and its applications in Plant Breeding, Green revolution. Horticulture, Organic farming, biofuels and phytoremediation.
- (viii) **Taxonomy and Embryology of Angiosperms (BY 1601):** Principles of APG system of classification, Family Fabaceae. Pollen-pistil interactions, self-incompatibility, seed dormancy and seed germination.

All the corrections suggested by the external expert Prof. Meenakshi Sharma, Dept. of Botany, University of Rajasthan were considered and incorporated in the syllabi of M.Sc. Biotechnology (III and IV sem), and Botany (Core/Subs.)

The meeting ended with a vote of thanks to the chair.

Dr. M.M. Sharma

**1.1.2 Percentage of Programmes where syllabus revision was carried out during the last five years**

<b>Programme – BSc Biotechnology (Hons)</b>	
<b>Prior BoS</b>	<b>Post BoS</b>
<b>Course – Diversity of Cryptogames and Microbes</b>	<b>Code: BY 1101</b>
<p>Viruses: History, general characteristics, classification, structure, types, life cycle and importance, Bacteriophages and their importance, Mycoplasma: General characteristics, morphology, reproduction and importance, Bacteria: History, general characters, classification, structure and economic importance. Algae: Occurrence, general characteristics, classification (F,E, Fritsch, 1935), thallus structure, pigments, reproduction and importance, Study of life cycle of the following genera: Volvox, Chara, Vaucheria, Polysiphonia. Bryophytes: Occurrence, distribution, general characteristics, alternation of generation, classification (Rothmaler, 1951) and economic importance. Study of life cycle of the Marchantia. Pteridophytes: Occurrence, general characteristics, classification (Reimer, 1954), stele system, seed habit and heterospory, apospory and apogamy, Study of life cycle of the Marsilea. Comparative study of the algae, bryophytes and pteridophytes in general.</p>	<p>Viruses: History, general characteristics, classification, structure, types, life cycle and importance, Bacteriophages and their importance, Mycoplasma: General characteristics, morphology, reproduction and importance. Bacteria: History, general characters, classification, structure and economic importance. Algae: Occurrence, general characteristics, classification (F, E, Fritsch, 1935), thallus structure, pigments, reproduction and importance. Study of life cycle of the following genera: Volvox, Chara, Vaucheria, Polysiphonia. Bryophytes: Occurrence, distribution, general characteristics, alternation of generation, classification (Rothmaler, 1951) and economic importance. Study of life cycle of the Marchantia. Pteridophytes: Occurrence, general characteristics, classification (Reimer, 1954), stele system, seed habit and heterospory, apospory and apogamy. <b>Study of life cycle of the <i>Lycopodium</i></b> and Marsilea. Comparative study of the algae, bryophytes and pteridophytes in general.</p>
<b>Course: Lichenology, Mycology And Plant Pathology</b>	<b>Course: Mycology, Plant Pathology and Lichenology</b>
<b>Code: BY 1201</b>	<b>Code: BY 1201</b>
<p>Lichens: General characteristics, structure, types, reproduction and ecological importance, Fungi: Occurrence, general characteristics, structure, classification (Alexopoulous and Mims, 1979), reproduction, parasexual cycle, heterothallism, mushroom cultivation and importance, Study of life cycle of the following genera: Albugo, Aspergillus, Puccinia. Plant diseases and their control measures: history, classification, symptoms, defense mechanism, mechanism of infection, host parasite interaction, transmission and dissemination of diseases. Causal organisms of disease cycle of the following: green ear disease of Bajra, rust of Crucifers, rusts and smuts of Wheat, red rot of sugarcane.</p>	<p>Fungi: Occurrence, general characteristics, structure, classification (Alexopoulous and Mims, 1979), reproduction, parasexual cycle, heterothallism, mushroom cultivation and importance, Study of lifecycle of the following genera: Albugo, Aspergillus, Puccinia. Plant diseases and their control measures: history, classification, symptoms, defense mechanism, mechanism of infection, host parasite interaction, transmission and dissemination of diseases. Causal organisms of disease cycle of the following: green ear disease of Bajra, rust of Crucifers, rusts and smuts of Wheat, red rot of sugarcane, <b>root knot disease, little leaf disease of brinjal, tobacco mosaic disease.</b> Disease Management: prophylaxis-quarantine measures, seed certification brief account of physical, chemical and biological control, <b>integrated pest management, role of information technology in disease control.</b> Lichens:</p>

Disease Management: prophylaxis-quarantine measures, seed certification brief account of physical, chemical and biological control.	General characteristics, structure, types, reproduction and ecological importance.
<b>Course: Morphology and Anatomy of Angiosperms Code: BY 1401</b>	
Morphology: Diversity of plant forms in annuals, biennials and perennials. Evolution of tree habit in monocotyledons and dicotyledons. Characteristics of monocotyledons and dicotyledons. Study of root, stem and leaf (structure and function). Primary and secondary growth, anomalous secondary growth in monocots and dicots. Anatomy: Tissue: simple and complex permanent tissues; types of meristem. Theories of origin of basic body parts of plants: histogen theory, tunica-carpus theory. Cambium, periderm, secretory, laticifer ducts and lenticels. Origin and development of leaf, stem, root system: root hair, branching and its patterns. Comparative anatomy of root, stem and leaf.	Morphology: Diversity of plant forms in annuals, biennials and perennials. Evolution of tree habit in monocotyledons and dicotyledons. Characteristics of monocotyledons and dicotyledons. Study of root, stem and leaf (structure and function). Primary and secondary growth, anomalous secondary growth in monocots and dicots. Anatomy: Tissue: simple and complex permanent tissues; types of meristem. Theories of origin of basic body parts of plants: histogen theory, tunica-carpus theory, <b>korper and kappe theory</b> . Cambium, periderm, secretory, laticifer ducts and lenticels. Origin and development of leaf, stem, root system: <b>stomata, stomatal index</b> , root hair, branching and its patterns, <b>vascular tissue differentiation</b> . Comparative anatomy of root, stem and leaf
<b>Course: Plant Physiology Code: BY 1501</b>	
Plant cell-water relations, water and mineral absorption, transpiration, guttation, mineral nutrition essential micro and macro nutrients, deficiency of minerals; nitrogen metabolism. Photosynthesis: chloroplast structure, photosynthetic pigments, photosystems, photophosphorylation, Calvin cycle, C <sub>4</sub> pathway, CAM, photorespiration. Respiration: RQ, ATP- the biological energy currency, glycolysis, Krebs's cycle, Electron transport mechanism, oxidative phosphorylation, pentose phosphate pathway. Growth and development: Plant growth regulators- Auxins, Gibberellins, Cytokinins, Abscisic acid general symptoms and their applications. Ethylene: biosynthesis, chemistry, its applications. Physiology of flowering: photoperiodism and vernalization, growth movements. Abscission and senescence.	Plant cell-water relations, water and mineral absorption, transpiration, guttation, mineral nutrition essential micro and macro nutrients, deficiency of minerals; nitrogen metabolism. Photosynthesis: chloroplast structure, photosynthetic pigments, photosystems, photophosphorylation, Calvin cycle, C <sub>4</sub> pathway, CAM, photorespiration. Respiration: RQ, ATP- the biological energy currency, glycolysis, Krebs's cycle, Electron transport mechanism, oxidative phosphorylation, pentose phosphate pathway. Growth and development: <b>Phase of growth and development</b> . Plant growth regulators- Auxins, Gibberellins, Cytokinins, Abscisic acid- general symptoms <b>physiological effects</b> and applications. Ethylene: biosynthesis, chemistry, its applications. Physiology of flowering: photoperiodism and vernalization, growth movements, <b>biological clock (circadian rhythm) and its regulation</b> . Abscission and senescence.
<b>Course: Botany Laboratory-V Code: BY 1531</b>	
Demonstration of phenomenon of osmosis by potato osmometer. Demonstration of phenomenon of transpiration in dorsiventral leaves using cobalt chloride paper. Study of the rate of transpiration using photometers. Demonstrate the use of light, CO <sub>2</sub> and chlorophyll are necessary for photosynthesis.	Demonstration of phenomenon of osmosis by potato osmometer. Demonstration of phenomenon of transpiration in dorsiventral leaves using cobalt chloride paper. Study of the rate of transpiration using photometers. Demonstrate the use of light, CO <sub>2</sub> and chlorophyll are necessary for photosynthesis. Demonstrate that O <sub>2</sub> is evolved during photosynthesis by Bell Jar experiment.

<p>Demonstrate that O<sub>2</sub> is evolved during photosynthesis by Bell Jar experiment. Determine the value of RQ of different respiratory substrates by Ganong's respirometer. Chlorophyll separation through solvent method. Study of germination of pollen grains. Demonstration of emasculation in plants. Preparation of list of plant breeding centers and their contributions with specific plants</p>	<p>Determine the value of RQ of different respiratory substrates by Ganong's respirometer, <b>estimation of mineral nutrient in plant ash</b>. Chlorophyll separation through solvent method. Study of germination of pollen grains. Demonstration of emasculation in plants. Preparation of list of plant breeding centers and their contributions with specific plants</p>
<p><b>Course: Plant Breeding Code: BY 1502</b></p>	
<p>History, introduction and scope of plant breeding, methods of plant breeding: selection, pedigree analysis, acclimatization, hybridization, heterosis and inbreeding depression. Renowned Indian and international plant breeders. Contributions of National and International institutes of plant breeding and centers for plant breeding. Brief account of mass selection, pure line and clonal selection, mutation and polyploidy breeding. Molecular marker systems: identification, utilization and integration in plant breeding programs.</p>	<p>History, introduction and scope of plant breeding, <b>Centers of origin of cultivated and food plants, Germplasm conservation, plant introduction, Methods of plant breeding in self and cross pollinated crops: selection, pedigree analysis, acclimatization, hybridization, heterosis and inbreeding depression. The Hardy-Weinberg Law and its application in plant breeding.</b> Brief account of mass selection, pure line and clonal selection, mutation and polyploidy breeding. Molecular marker systems: identification, utilization and integration in plant breeding programs. Renowned Indian and international plant breeders. Contributions of National and International institutes of plant breeding and centers for plant breeding. <b>Green revolution. Horticulture, Organic farming, biofuels and phytoremediation.</b></p>
<p><b>Course: Taxonomy and Embryology of Angiosperms Code: BY 1601</b></p>	
<p>Taxonomy: Systems of classification: artificial systems, natural system, phylogenetic system; salient features of the system proposed by Linnaeus, Bentham and Hooker. Binomial nomenclature, ICBN, Botanical gardens and herbaria of India. Study of members of the following families: Brassicaceae, Malvaceae, Papilionaceae, Asteraceae, Asclepiadaceae, Solanaceae, Euphorbiaceae and Poaceae. Embryology: Structure of anthers, microsporogenesis, pollination and its types, pollen germination. Megasporogenesis, ovule development, types of ovules, development and types of embryo sac and double fertilization, endosperm and its types. Embryogenesis: embryodevelopment, polyembryony, Structure of seed in monocotyledons and dicotyledons, Seed dormancy.</p>	<p>Taxonomy: Systems of classification: artificial systems, natural system, phylogenetic system; salient features of the system proposed by Linnaeus, Bentham and Hooker, <b>Principles of APG system of classification.</b> Binomial nomenclature, ICBN, Botanical gardens and herbaria of India. Study of members of the following families: Brassicaceae, Malvaceae, <b>Fabaceae</b>, Asteraceae, Asclepiadaceae, Solanaceae, Euphorbiaceae and Poaceae. Embryology: Structure of anthers, microsporogenesis, pollen germination. Megasporogenesis, ovule development, types of ovules, development and types of embryo sac. Pollination and its types, post pollination events: <b>pollen-pistil interaction, self-incompatibility,</b> fertilization and double fertilization, endosperm and its types. Embryogenesis: embryo development, polyembryony, Structure of seed in monocotyledons and dicotyledons, Seed dormancy and <b>seed germination.</b></p>