# BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024

## M.Phil. Medicinal Plant Biotechnology [FT / PT] Programme

(For the candidates to be admitted from the academic year 2009-2010 onwards)

| Semester I | Title of the Course | Marks | | | Credits |
|---|---|---|---|---|---|
| | | IA | UE | Total | |
| Course -I | Research Methodology | 40 | 60 | 100 | 4 |
| Course - II | Medicinal Plants, Micro propagation and Intellectual Property Rights | 40 | 60 | 100 | 4 |
| Course- III | Paper on Topic of Research (Guide will prepare the syllabus and it will be sent to the COE) | 40 | 60 | 100 | 4 |
| Course – IV | Teaching and Learning skills (Common Paper) | 40 | 60 | 100 | 4 |
| **Semester II** | | | | | |
| | Dissertation and Viva-Voce<br>Viva Voce 50 marks<br>Dissertation 150 marks | | | 200 | 8 |

**For each Course other than the Dissertation**

| | |
|---|---|
| Continuous Internal Assessment | – 40 Marks |
| End Semester Examination | – 60 Marks |
| Total | – 100 Marks |

**Question paper pattern for Course I - III**

| | |
|---|---|
| 10 questions compulsory | 10 x 01 = 10 Marks (2 from each unit) |
| 5 questions | 05 x 04 = 20 Marks (either or type, one from each unit) |
| 3 questions from 5 | 03 x 10 = 30 Marks (one question from each unit) |

Total 60 Marks

**Question paper pattern for Course IV**

5 Questions 05 x 12 = 60 Marks (either or type, one from each unit)

**CIA components**

| | | |
|---|---|---|
| Tests | (2x10) - | 20 Marks |
| Term Paper | – | 10 Marks |
| Seminar | - | 10 Marks |

## Eligibility

1. M.Sc. Botany,
2. M.Sc Plant Biotechnology,
3. M.Sc .Biotechnology,
4. M.Sc. Biochemistry,
5. M.Sc. Microbiology,
6. M.Sc. Life Science,
7. M.Sc. Plant Science,
8. M.Sc. Applied Plant science,
9. M.Sc. Herbal Science,
10. M.Sc. Plant Biology and Biotechnology,
11. M.Sc. Environmental Science and
12. M.Sc. Environmental Biotechnology.

## COURSE I

**Credits: 4**

## RESEARCH METHODOLOGY

**Unit 1**

Principles and Operation methods of Weighing devices, pH, salinity and conductivity meters. Preparation of Buffers and stock solutions of media and reagents. Preparation of normality, ppm, molar and percentage solutions. Calibration of stage and ocular meter for micrometry and Haemocytometer. Centrifugation: Low speed, high speed, and Ultra and Refrigerated centrifuges. **10 hours**

**Unit 2**

Spectrometry: UV, IR, NMR and A.A.Spectroscopy. Electrophoresis:Gel electrophoresis, Polyacrylamide gel electrophoresis (PAGE & SDS PAGE) and Agarose gel electrophoresis, comet assay. Two dimensional electrophoresis, Vertical electrophoresis. Horizontal electrophoresis, Paper electrophoresis, Southern Blot, Northern Blot, Western Blot, DNA finger printing. **10 hours**

**Unit 3**

Extraction methods: Crude extracts. Distillation, Separation procedures. Chromatography: Principles, working procedure, functions and application of CC, TLC, PC, GC, GLC, HPLC, HPTLC, Fourier Transform IR and MS. **10 hours**

**Unit 4**

Basics of computers and Biostatistics: Types of Computers – mini – macro system, Anatomy of computers, Operation Devices, DOS Files, Internal and External DOS commands, File management. Compilation and analysis of data, Standard deviation,

ANOVA, T-Test, Chi-square analysis. Principles of Bioinformatics: Collection and storing of sequences, alignment of pairs of sequences, multiples sequences alignment, database searching for sequences. Gene, protein, classification, structure and prediction.

**10 hours**

**Unit 5**

Methods of Pharmaceutical Research. Print and online sources of medicinal plant literature. Reference and Bibliography. Preparation of Manuscripts, presentations and Theses. **10 hours**

**References**


Becker, J.M., Caldwell, G.A. and Zachgo, E.A. 1996. Biotechnology: A Laboratory Course, 2nd Edn. Academic Press, Inc., San Diego, California.

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Mount, D.W. 2003. Bioinformatics: Sequence and Genome Analysis. CBS Puiblishers and Distributors, New Delhi.

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Sillince, J.A. and Silline, M. 1991. Molecular databse for protein sequence and structural studies. Springer-Verlag, New York.

Willard, H.H., Merritt, L., Dean, J.A., Settle, F.A. Instrumental Methods of Analysis, 1st

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Wilson, K. and Walker, J. 1997. Practical Biochemistry: Principles and Techniques. Cambridge University Press, Cambridge.

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## COURSE II

**Credits: 4**

## MEDICINAL PLANTS, MICROPROPAGATION AND INTELLECTUAL PROPERTY RIGHTS

**Unit 1**

Principles and Medicinal Plants in Indigenous Systems: Institutionalized - Ayurveda, Siddha, Unani and Homeopahty. Non-institutionalized – Ethnomedicine

**8 hours**

**Unit 2**

Drugs Developed from traditional medicines. Traditional medicines under trial for developing drugs. The role of ethnobotany in relation to drug discovery in India. Plants in folklore with special reference to South India. Special accounts on the Todas, Irulas, Palliyans, Malayalis and Kanis in Tamil Nadu.

**10 hours**

**Unit 3**

Micropropagation - Preparative stage: Germplasm acquisition and Selection of explant. Establishment stage: axenic and viable cultures. Multiplication stage. Plantlet production: induction of root and acclimatization of plantlets to greenhouse conditions. Establishment under field conditions. Somatic embryogenesis, synthetic seed technology. Somaclonal variations. **10 hours**

**Unit 4**

In vitro production of secondary metabolites. Cell suspension, callus and protoplast culture, cell line selection and mass culture. Factors affecting product synthesis. Manipulation of culture media, metabolic sinks. Hormones, precursor feeding (L-, codeinone) elicitation. Introduction to metabolic engineering for improving secondary metabolite productivity. **11 hours**

**Unit 5**

Brioprospecting and equitable compensation and Biopiracy. Intellectual Property in Drug Discovery and Biotechnology: Patent protection and strategy Requirements for patenting in India, China, Japan, Europe and U.S.A. WIPO, WTO and TRIPS in relation to pharmaceutical research. Controversies in drug patents. **11 hours**

**References**

Banthrope, D.V. and Charlwood, B.V. 1980. The Terpenoids. In: Bell, E.A., and Charlwood, B.V. Secondary Plant Products. (Encyclop. Plant Physiology, Vol. 8). Springer Verlag, Berlin.

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## COURSE –IV – TEACHING AND LEARNING SKILLS

**Objectives:**

- acquaint different parts of computer system and their functions
- understand the operations and use of computers and common Accessories
- develop skills of ICT and apply them in teaching learning context and Research
- appreciate the role of ICT in teaching, learning and Research
- acquire the knowledge of communication skill with special reference to its elements, types, development and styles
- understand the terms communication Technology and Computer mediated teaching and develop multimedia / e-content in their respective subject
- understand the communication process through the web
- acquire the knowledge of Instructional Technology and its Applications
- develop different teaching skills for putting the content across to targeted audience

### Unit I – Computer Application Skills

Computer system: Characteristics, Parts and their functions – Different generations of Computer – Operation of Computer: switching on / off / restart, Mouse control, Use of key board and some functions of key – Information and Communication Technology (ICT): Definition, Meaning, Features, Trends – Integration of ICT in teaching and learning – ICT applications: Using word processors, spread sheets, Power point slides in the classroom – ICT for Research: On-line journals, e-books, Courseware, Tutorials, Technical reports, Theses and Dissertations

### Unit II – Communication Skills

Communication: Definitions – Elements of Communication: Sender, Message, Channel, Receiver, Feedback and Noise – Types of Communication: Spoken and written; Non-verbal communication – Intrapersonal, Interpersonal, Group and Mass communication – Barriers to

communication: Mechanical, Physical, Linguistic & Cultural – Skills of communication: Listening, Speaking, Reading and writing – Methods of developing fluency in oral and written communication – style, Diction and Vocabulary – Classroom communication and dynamics

**Unit III – Communication Technology**

Communication Technology: Bases, Trends and Developments – Skills of using Communication Technology – Computer Mediated Teaching: Multimedia, E-content – Satellite-based communication: EDUSAT and ETV channels, Communication through web: Audio and Video applications on the Internet, interpersonal communication through the web.

**Unit IV – Pedagogy**

Instructional Technology: Definition, Objectives and Types – Difference between Teaching and Instruction – Lecture Technique: Steps, Planning of a Lecture, Delivery of a lecture – Narration in tune with the nature of different disciplines – Lecture with power point presentation – Versatility of lecture technique – Demonstration, Characteristics, Principles, Planning Implementation and Evaluation – Teaching – Learning Techniques: Team Teaching, Group discussion, Seminar, Workshop, Symposium and Panel Discussion – Models of teaching: CAI, CMI and WBI

**Unit V – Teaching Skills**

Teaching skill: Definition, Meaning and Nature – Types of Teaching skills: Skill of Set Induction, Skill of Stimulus Variation, Skill of Explaining, Skill of Probing Questions, Skill of Black Board writing and Skill of Closure – Integration of Teaching Skills – Evaluation of Teaching Skills

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3. Information and Communication Technology in Education: A Curriculum for Schools and programme of Teacher development, Jonathan Anderson and Tom Van Weart, UNESCO, 2002

4. Kumar K.I (2008) Educational Technology, New Age International Publishers, New Delhi

5. Mangal, S.K. (2002) Essential of Teaching – Learning and Information Technology, Tandon Publications, Ludhiana

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8. Ram Babu A. and Dandapani S (2006) Microteaching (Vol.1&2) Neelakamal Publications, Hyderabad

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