

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639 005

M.Phil., BOTANY COURSE STRUCTURE UNDER CBCS SYSTEM

(For the candidates admitted from the year 2012-13 onwards)

Program Outcome (POs)

Knowledge and understanding about plant diversity

Practical skills in the field and laboratory experiments.

Hands on expertise in Biological sciences

Scientific knowledge in life science and fundamental metabolism of plants.

Enhanced skills in handling scientific instruments, planning and executing biological research.

Program Specific Outcome (PSOs)

The students will be able to acquire knowledge about the nature and function of genes.

To know the processes of inheritance as they influence the characteristics of populations.

To know the state of art of research in botany,

To plan and carry out short term research projects,

To present the collected data as thesis, publication, seminar presentation, etc.

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SEMESTER	COURSE	SUBJECT TITLE	SUBJECT CODE	INSTR. HOURS WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
							INT	ESE	
I	Core Course – I	Research Methodology	12MBO1	--	4	3	40	60	100
	Core Course – II	Advances in Plant Sciences	12MBO2	--	4	3	40	60	100
	Core Course – III	Paper on topic of Research (To be framed by Guide)*	12MBO3A	--	4	3	40	60	100
	Core Course – IV	Teaching and Learning Skills (Common Paper)	12MBO4	--	4	3	40	60	100
II	Dissertation	Viva voce – 50 marks Dissertation – 150 marks	12MBOPW	--	8	--	--	--	200
					--	24			600

Note:* For Course III the syllabus will be framed by the Guide and the Examination will be conducted by the Controller of Examinations.

Allocation of Marks:

Component	Maximum	Passing Minimum
Internal	40	20
End Semester Examinations	60	30
Project Work – Viva Voce	50	25
Project Work – Dissertation	150	75

Component for Internal:

2 Tests = 2x10 = 20 Marks; Term Paper – 10 Marks; and Seminar – 10 Marks

Question Paper Pattern:

5 Questions – Either or Type – 5x12 = 60 Marks

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CONTROLLER OF EXAMINATIONS

Sl. No.:

Subject Code:

12MBO1

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

M.Phil., BOTANY – I SEMESTER – CORE COURSE -I

(For the candidates admitted from the year 2012-13 onwards)

RESEARCH METHODOLOGY

Course Outcomes

On the completion of this course the students will be able

- To learn about the principles of centrifugation
- To know about the mechanism and application of types of microscopes.
- To bring out the knowledge about cell structure, organization and its function.
- To acquire knowledge about cytoskeletons and pattern of cell cycle.
- To understand the sources of Data collection

Unit 1 - Centrifugation and Microscopy

Centrifugation: Principle and Types of centrifuges. Ultracentrifugation, density gradient centrifugation and continuous centrifugation. **Microscopy** - Differential interference contrast (DIC), polarization, Confocal microscopy, - Fluorescent Microscopy, dark field and phase contrast microscopy. Electron microscope- SEM and TEM. Atomic Force Microscopy. Histochemical and Cytological techniques.

Unit 2 - Spectrometry, Electrophoresis and Separation Techniques

Spectrometry- Principle – Beer and Lambert's Law. UV, IR, FTIR, Atomic Absorption Spectroscopy, CD, Stop Flow, Mass, MALDI-TOF and NMR. **Electrophoresis:** Principle of Gel electrophoresis, Polyacrylamide gel electrophoresis (PAGE & SDS PAGE) and Agarose gel electrophoresis, comet assay and capillary electrophoresis. Two dimensional electrophoresis and isoelectrofocussing. **Chromatography:** Principle, Procedures and Application of TLC, PC, Gel Filtration and Ion exchange, Affinity Chromatography, GC, GLC, HPLC/FPLC and HPTLC.

Unit 3 - Molecular Biological Techniques

Molecular biological techniques: Isolation and amplification of nucleic acid- Genome DNA (E.coli), Plasmid DNA, total RNA, Polymerase chain reaction – Types and its application. **Gene cloning techniques:** Phosphatase treatment of cloning vectors, use of adapters and linkers in cloning-screening of recombinants-labelling of nucleic acids by radioactive methods plaque and colony hybridization-southern blotting and western blot-Northern blot-DNA finger printing and Microarray.

Unit 4 - Biostatistics

Biostatistics: Collection and Presentation of Experimental data – Measures of Central Tendency: Arithmetic Mean, Median, Mode, Position of averages, Geometric Mean, Harmonic mean and percentile – Measures of Dispersion: Range, Inter quartile range, variance, standard deviation and standard error. Correlation and Regression: Correlation coefficient – Types of correlation – Regression Simple and Linear regression – Biological significance of correlation and regression – Tests of significance: Basis of statistical inference – Student's 't' test for mean, difference of means and test for correlation and regression coefficients – Chi-square test – Analysis of variance and DMRT.3.

Unit 5 - Data collection, analysis and Research Publications

Data collection and analysis-Web browsing and searching- Electronic biological data bases – NCBI, PubMed, Sequence and Structure data bases. Research publications of manuscripts- full paper, short communications and LCD preparations – Online submission - Review paper, Thesis writing, Bibliography, Index card and Proof reading.

References:

1. Batschelet, E. 1991. Introduction to Mathematics for Life Scientists. Springer International Student Edn., Narosa Publishing House, New Delhi.
2. Becker, J.M., Caldwell, G.A. and Zachgo, E.A. 1996. Biotechnology: A Laboratory Course, 2nd Edn. Academic Press, Inc., San Diego, California.
3. Cannel, J.P. 1998. Natural Products Isolation. Humana Press, New Jersey, USA.
4. Chirikjian, J.G. 1995. Biotechnology: Theory and Techniques Vol. I. Plant Biotechnology, Animal Cell Culture, Immunobiotechnology. Jones and Bartlett Publishers, London, England.
5. Cynthia Gibas and Per Jambek. 2001. Developing Bioinformatics computer skills, Shroff Pub., Mumbai.
6. Forthofer, L. 1995. Introduction to Biostatistics, Academic Press, New York.
7. Gupta, S.C. and Kapoor, V.K. 2002. Fundamentals of Mathematical Statistics, (11th Edn.). Sultan Chand & Sons, New Delhi.
8. Harborne, J.B. 1998. Phytochemical Methods. Chapman & Hall, London.
9. Jordan, D.W. and Smith, P. 2002. Mathematical Techniques. Oxford University Press, New Delhi.
10. Primrose, et al. 2005. Principles of gene manipulation. Black Well Science, London.
11. Sambrook and Russel. 2001. Molecular cloning-A laboratory manual. Cold Spring Laboratory Press, New York.
12. Sharma, B.K 1996. Instrumental Methods of Chemical Analysis. Goel Publishing House, Meerut.
13. Sokal, R. R. and Rohlf, F.J. 1987. Introduction to Biostatistics (Biology-Statistics Series). W.H. Freeman & Company, New York.
14. Snedecor, GW and Cochran, WG. 1967. Statistical methods. Oxford & IBH Pub. New Delhi. 4
15. Wilson, K. and Walker, J. 1997. Practical Biochemistry: Principles and Techniques. Cambridge University Press, Cambridge.
16. Zar, J. H. 2006. Biostatistical Analysis: Prentice-Hall.
17. Gurumani, N. 2006. Research Methodology for Biological Sciences, MJP publishers. A Unit Tamil Nadu Book House, Chennai.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05**M.Phil., BOTANY – I SEMESTER – CORE COURSE -II**

(For the candidates admitted from the year 2012-13 onwards)

ADVANCES IN PLANT SCIENCES**Course Outcomes****On the completion of this course the students will be able to**

Acquire knowledge on advanced strategies of genetic engineering

Bring out the knowledge on Selection of vectors, cloning strategies.

Know the optimization of sequences and mutagenesis expression of DNA sequences.

Know the nitrogen metabolism in plants.

Unit – I. Plant Genome Organization

Plant Genome Organization – Structural features of a representative plant gene. Chromatin and gene families in plants. Organization of chloroplast and mitochondrial genome. Nucleus encoded and chloroplast encoded genes for chloroplast proteins.

Targeting of proteins to mitochondria.

Unit – II. Gene expression and Protein Engineering

Regulation of prokaryotic and eukaryotic gene expression and gene silencing. Genetic code, protein synthesis – Initiation and their regulation – Elongation and elongation factors, aminoacylation of tRNA, aminoacyl tRNA synthesis, translation, inhibitors, post – translation modification of proteins.

Unit – III. Genetic Engineering

Genetic engineering in plants – Selectable markers, reporter genes and promoters used in plant vectors – Plant transformation technology – Ti and Ri Plasmids, Mechanism of gene transfer in plants – Direct gene transfer methods – Electroporation, microprojectile bombardment methods, microinjection. Transgenic plants – virus resistance, pest resistance, herbicide resistance, resistance to Fungi and Bacteria.

Unit – IV. Nitrogen Metabolism and Fixation

Nitrate and ammonium assimilation, aminoacid biosynthesis, molecular basis of symbiotic nitrogen fixation by Rhizobium. Non –symbiotic (Acetobacter) association and associative (Azospirillum). Phosphate solubilization and mobilization.

Unit – V. Molecular marker – Aided Breeding

Molecular marker – aided breeding – RFLP maps, linkage analysis, RAPD markers, microsatellites, SCAR (Sequence Characterized Amplified Regions), SSCP (Single Standard Conformational Polymorphism), AFLP, QTL, map base cloning, Molecular marker assisted selection.

References:

1. H.S.Chawla. 2001. Introduction to Plant Biotechnology. Oxford & IBH Publishing Co. Pvt. Ltd. 5
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5. Westhoff, P. 1998. Molecular plant development from gene to plant. Oxford University Press, Oxford, UK.
6. Plummer, DT. 1988. An introduction to practical Biochemistry. Tata McGraw Hill Pub. Co. Ltd., New Delhi.
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Sl. No.:

Subject Code:

12MBO4

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

M.Phil., BOTANY– I SEMESTER – CORE COURSE - IV

(For the candidates admitted from the year 2012-13 onwards)

TEACHING AND LEARNING SKILLS

Course Outcomes:

On the completing the course, scholars will be able to:

- 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

Unit I: Computer Applications 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 – Modes 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.

References:

1. Bela Rani Sharma (2007), Curriculum Reforms and Teaching Methods, Sarup and sons, New Delhi.
2. Don Skinner (2005), Teaching Training, Edinburgh University Press Ltd, Edinburgh
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, KL (2008) Educational Technology, New Age International Publishers, New Delhi
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