Hand book of **Postgraduate Curricula**

The Graduate School
ICAR-Indian Agricultural Research Institute
New Delhi 110012

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New Delhi

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(A DEEMED TO BE UNIVERSITY UNDER SECTION 3 OF UGC ACT, 1956)
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Foreword

The Graduate School, IARI previously known as IARI PG School continues to play a pivotal role in national and international leadership in human resource development with aim to attain new heights as per NEP 2020 and world standards. It seeks continuous innovation in course content and the implementation of novel teaching approaches. The course curricula development is a part of the continued process for dynamic improvement of national agricultural education system. The revised course curricula for Post Graduate programs at IARI have been framed in line with BSMA guidelines, following flexible, multi-disciplinary and holistic approach**.** The revised edition of the PG School calendar is being brought out shortly. I am happy to note that out of the PG School calendar, popularly known as 'Green Book', the present Handbook of PG Course Curriculum christened as 'Blue book' has been designed and developed with objective to provide an easy to refer resource book for students and faculty of IARI and its academic collaborators.

I extend compliments to the drafting and editing team of Dr Aditi Kundu, Dr Deeba Kamil, Dr Tirthankar Banerjee, Dr Anil Dahuja and Dr Neera Singh for their sincere endeavors in bringing out this document. I compliment the IARI faculty and Professors of 26 disciplines for their inputs. Special thanks go to Dr. Anupama Singh, Dean and Joint Director (Edn.), IARI for her vision and guidance to the team engaged in the task and members of the Editorial Committee. Appreciation extends to the entire team of The Graduate School and members of 62nd Convocation Publication Committee.

(AK Singh)

Date: February 9th, 2024
Place: New Delhi-110 012

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Dr. Anupama Singh
Dean & Joint Director (Edu.)

Preface

The Graduate School, ICAR-Indian Agricultural Research Institute, New Delhi established as part of the Deemed University in 1958, has been a frontrunner in delivering top-notch agricultural education at the graduate and post-graduate levels in the country. Between 1923 and 1958, IARI spearheaded agricultural education in country by conferring the 'Associateship of IARI' (equivalent to M.Sc.) upon 903 scholars. In 1958, admission to PG degrees was limited to six fields, which has since expanded to 26 for M.Sc., one for M.Tech., and 26 for Ph.D. To date, 4823 M.Sc., 100 M.Tech. and 5360 Ph.D. degrees have been awarded, including 507 international students. Currently, there are 2687 students, comprising 585 M.Sc./ M. Tech., 717 UG, 1385 Ph.D., and 16 international students. The Graduate School at IARI has made significant contributions by producing M.Sc. and Ph.D. degree holders who occupy key positions nationally and internationally, contributing to advancements in crop varieties, production, and protection technologies.

The Institute has adopted BSMA approved course curriculum for Post Graduate and Ph.D. degree programs with the objective to accustom the students with the latest agricultural education and research innovations. The course curriculum is based on the Choice based Credit System. As per recommendations of the National Education Policy-2020, the courses have been categorized as Major and Minor/Optional courses, summarized as a book. The present handbook embodies all compulsory and supportive course for PG & PhD programmes being run at IARI and across its academic collaborators in ICAR.

A comprehensive listing of course curricula offered discipline wise are described in line with approved amendments by the Academic Council. The syllabus has been augmented suitably with the view to equip the IARI students to gain knowledge, enhance their employability and skill sets required for diverse career domains and to commensurate with global standards through Choice Based Credit System (CBCS), students are given opportunities to select the courses to support their planned research activities.

It is hoped that the Handbook of PG Course Curricula, IARI nicknamed as 'Blue book' will serve as ready reckoner for the students and faculty of IARI Graduate School and the future aspirants. I sincerely thank Drs Aditi Kundu, Deeba Kamil, Tirthankar Banerjee, Atul Kumar and Gyan P. Mishra for their untiring efforts to draft the document. The sincere efforts of the editors Dr. Anil Dahuja and Dr. Neera Singh are appreciated. Contributions of Professors, Faculty of all disciplines and The Graduate School team are sincerely acknowledged.

(Anupama Singh)

Date: February 9th, 2024

Place: New Delhi-110 012

Content

Definitions of Academic Terms

Chairperson means a teacher of the major discipline proposed by the Joint Director (Edn.) & Dean, The Graduate School, ICAR-IARI, New Delhi to act as the Chairperson of the Advisory Committee and also to guide the student on academic issues.

Course means a unit of instructions in a discipline carrying a specific number and credits to be covered in a semester as laid down in detail in the syllabus of a degree programme.

Credit means the unit of work load per week for a particular course in theory and/ or practical. One credit of theory means one class of one clock hour duration and one credit practical means one class of minimum two clock hours of laboratory work per week.

Credit load of a student refers to the total number of credits of all the courses he/ she registers during a particular semester.

Grade Point (GP) of a course is a measure of performance. It is obtained by dividing the percent mark secured by a student in a particular course by10, expressed and rounded off to second decimal place.

Credit Point (CP) refers to the grade point multiplied by the number of credit of the course, expressed and rounded off to second decimal place.

Grade Point Average (GPA) means the total credit point earned by a student divided by total number of credits of all the courses registered in a semester, expressed and rounded off to second decimal place.

Cumulative Grade Point Average (CGPA) means the total credit points earned by a student divided by the total number of credits registered by the student until the end of a semester (all completed semesters), expressed and rounded off to second decimal place.

Overall Grade Point Average (OGPA) means the total credit points earned by a student in the entire degree programme divided by the total number of credits required for the P.G. degree, expressed and rounded off to second decimal place.

Introduction

Indian Council of Agricultural Research for dynamic improvement of national agricultural education system constituted a National Core Group (NCG) for restructuring of Master's and Ph.D. curriculum, syllabi and academic regulations for the disciplines under agricultural sciences. On the recommendations of the NCG, 19 Broad Subject Matter Area (BSMA) committees were constituted by the ICAR for revising the syllabus. The course curricula of ICAR-Indian Agricultural Research Institute (IARI) have been aligned with BSMA guidelines for the Post Graduate and Ph.D. degree programs. This document is a comprehensive listing of course curricula offered by various disciplines, updated in line with approved amendments by the Academic Council of ICAR-IARI. The Academic Council of ICAR-IARI in the 417th meeting held on 27 August, 2022 approved BSMA courses/syllabi for implementation from 2022-23 academic sessions. The course title, code and credit hours are retained as per BSMA recommendations. As per the Academic Council's recommendations, only 500 series courses are applicable for M.Sc./M.Tech. programs while for Ph.D. programs only 600 series courses are applicable. However, the 500 series courses could be opted by the Ph.D. students in supporting/ other courses category. Over the years, the IARI has generated a large pool of trained human resource in the specialized areas such as "Environmental Sciences" and "Water Science and Technology" to address emerging challenges in the field of agriculture. The PG and Ph.D. courses in these disciplines have, therefore, been introduced in addition to BSMA approved disciplines

1. Academic Year and Registration

An academic year shall be normally from July to June of the following calendar year unless required otherwise under special situations. It shall be divided into two academic terms known as semesters. The Academic Calendar shall be developed by The Graduate School and notified accordingly by the Registrar in advance. It will clearly mention the dates of registration, commencement of classes, semester end examination, end of semester and academic year etc. An orientation programme shall be organized by the Joint Director (Edn.) & Dean TGS for the benefit of the newly admitted students immediately after commencement of the semester.

- On successful completion of a semester, the continuing students shall register for subsequent semester on the date specified in the Academic/Semester Calendar or specifically notified separately. Every enrolled student shall be required to register at the beginning of each semester till the completion of his/her degree programmes.

2. Credit Requirements

2.1 Frame Work of the Courses

The following nomenclature and credit hours need to be followed while providing the syllabus for all the disciplines.

Courses	Masters' Programme	Doctoral Programme
(i) Coursework		
Major courses	20	12
Minor courses	08	06
Supporting courses	06	05
Common courses	05	–
Seminar	01	02
(ii) Thesis Research	30	75
Total	70	100

Major courses: Courses in discipline in which a student takes admission.

Minor courses: Courses from the subjects closely related to student's major dicipline in place of subject.

Supporting courses: The subject not related to the major subject. It could be any subject considered relevant for student's research work (such as Statistical Methods, Design of Experiments, etc.) or necessary for building his/her over all competence.

Common Courses: The following courses (one credit each) will be offered to all students undergoing Master's degree programme:

Course Code	Course Title	Credit hours (L+P)
PGS 501	Library and Information Services	0+1
PGS 502	Technical Writing and Communications Skills	0+1
PGS 503	Intellectual Property and its Management in Agriculture	1+0
PGS 504	Basic Concepts in Laboratory Techniques	0+1
PGS 505	Agricultural Research, Research Ethics and Rural Development Programmes	1+0

Some of these courses are already in the form of e-courses/ MOOCs. The students should be allowed to register these courses/similar courses on these aspects, if available online on SWAYAM or any other platform. If a student has already completed any of these courses during UG, he/she should be permitted to register for other related courses with the prior approval of the Head of Department (HoD)/ Professor/ Board of Studies (BoS).

2.2 Supporting Courses

The following courses are being offered by various disciplines (The list is only indicative). Based on the requirement, any of the following courses may be opted under the supporting courses. The syllabi of these courses are available in the respective disciplines. If required, the contents may be modified to suit the individual discipline with approval of the concerned BoS.

Code	Course Title	Credits
STAT 501	Mathematics for Applied Sciences	2+0
STAT 502	Statistical Methods for Applied Sciences	3+1
STAT 511	Experimental Designs	2+1
STAT 512	Basic Sampling Techniques	2+1
STAT 521	Applied Regression Analysis	2+1
STAT 522	Data Analysis Using Statistical Packages	2+1
MCA 501	Computers Fundamentals and Programming	2+1
MCA 502	Computer Organization and Architecture	2+0
MCA 511	Introduction to Communication Technologies, Computer Networking and Internet	1+1
MCA 512	Information Technology in Agriculture	1+1
BIOCHEM 501	Basic Biochemistry	3+1
BIOCHEM 505	Techniques in Biochemistry	2+2

2.3 Syllabus of Common Courses for PG Programmes

LIBRARY AND INFORMATION SERVICES (0+1)

Objective

To equip the library users with skills to trace information from libraries efficiently, to apprise them of information and knowledge resources, to carry out literature survey, to formulate information search strategies, and to use modern tools (Internet, OPAC, search engines, etc.) of information search.

Practical

Introduction to library and its services; Role of libraries in education, research and technology transfer; Classification systems and organization of library; Sources of information-Primary Sources, Secondary Sources and Tertiary Sources; Intricacies of abstracting and indexing services (Science Citation Index, Biological Abstracts, Chemical Abstracts, CABI Abstracts, etc.); Tracing information from reference sources; Literature survey; Citation techniques/Preparation of bibliography; Use of CD-ROM Data bases, Online Public Access Catalogue and other computerized library services; Use of internet including search engines and its resources; e-Resources access methods.

TECHNICAL WRITING AND COMMUNICATION SKILLS (0+1)

Objective

To equip the students/ scholars with skills to write dissertations, research papers, etc.

To equip the students/scholars with skills to communicate and articulate in English (verbal as well as writing).

Practical (Technical Writing)

Various forms of scientific writings- theses, technical papers, reviews, manuals, etc; Various parts of thesis and research communications (title page, authorship, contents page, preface, introduction, review of literature, materials and methods, experimental results and discussion); Writing of abstracts, summaries, precise, citations etc.; Commonly used abbreviations in the these and research communications; Illustrations, photographs and drawings with suitable captions; Pagination, numbering of tables and illustrations; Writing of numbers and dates in scientific write-ups; Editing and proof-reading; Writing of a review article. Communication Skills-Grammar (Tenses, parts of speech, clauses, punctuation marks); Error analysis (Common errors); Concord; Collocation; Phonetic symbols and transcription; Accentual pattern: Weak forms in connected speech: Participation in group discussion: Facing an interview; Presentation of scientific papers.

Suggested Readings

1. Barnes and Noble. Robert C. (Ed.). 2005. *Spoken English: Flourish Your Language*.
2. *Chicago Manual of Style*. 14th Ed. 1996. Prentice Hall of India. *Collins Cobuild English Dictionary*.
3. Harper Collins. Gordon HM and Walter JA. 1970. *Technical Writing*. 3rd Ed.
4. Holt, Rinehart and Winston. Horn by AS. 2000. *Comp. Oxford Advanced Learner's Dictionary of Current English*. 6th Ed. Oxford University Press.
5. James HS. 1994. *Handbook for Technical Writing*. NTC Business Books.

6. Joseph G. 2000. *MLA Handbook for Writers of Research Papers*. 5th Ed. Affiliated East- West Press.
7. Mohan K. 2005. *Speaking English Effectively*.
8. MacMillan India. Richard WS. 1969. *Technical Writing*.
9. Sethi J and Dhamija PV. 2004. *Course in Phonetics and Spoken English*. 2nd Ed. Prentice Hall of India.
10. Wren PC and Martin H. 2006. *High School English Grammar and Composition*. S. Chand & Co.

INTELLECTUAL PROPERTY AND ITS MANAGEMENT IN AGRICULTURE (1+0)

Objective

The main objective of this course is to equip students and stake holders with knowledge of Intellectual Property Rights (IPR) related protection systems, their significance and use of IPR as a tool for wealth and value creation in a knowledge-based economy.

Theory

Historical perspective and need for the introduction of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement; Intellectual Property and Intellectual Property Rights (IPR), benefit so securing IPRs; Indian Legislations for the protection of various types of Intellectual Properties; Fundamentals of patents, copyrights, geographical indications, designs and lay out, trade secrets and traditional knowledge, trademarks, protection of plant varieties and farmers' right sand biodiversity protection; Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection; National biodiversity protection initiatives; Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture; Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement.

Suggested Readings

1. Erbisch FH and Maredia K. 1998. *Intellectual Property Rights in Agricultural Biotechnology*. CABI.
2. Ganguli P. 2001. *Intellectual Property Rights: Unleashing Knowledge Economy*. McGraw-Hill.
3. *Intellectual Property Rights: Key to New Wealth Generation*. 2001. NRDC and Aesthetic Technologies.
4. Ministry of Agriculture, Government of India. 2004. *State of Indian Farmer*. Vol. V. Technology Generation and IPR Issues. Academic Foundation.
5. Rothschild M and Scott N. (Ed.). 2003. *Intellectual Property Rights in Animal Breeding and Genetics*. CABI.
6. Saha R. (Ed.). 2006 .*Intellectual Property Rights in NAM and Other Developing Countries: A Compendium on Law and Policies*. Daya Publ. House.
7. The Indian Acts - Patents Act, 1970 and amendments; Design Act, 2000; Trademarks Act,1999; The Copyright Act, 1957 and amendments; Layout Design Act, 2000; PPV and FR Act 2001, and Rules 2003; The Biological Diversity Act, 2002.

BASIC CONCEPTS IN LABORATORY TECHNIQUES (0+1)

Objective

To acquaint the students about the basics of commonly used techniques in laboratory.

Practical

Safety measures while in Lab; Handling of chemical substances; Use of burettes, pipettes, measuring cylinders, flasks, separator funnel, condensers, micropipettes and vaccupets; Washing, drying and sterilization of glassware; Drying of solvents/chemicals. Weighing and preparation of solutions of different strengths and their dilution; Handling techniques of solutions; Preparation of different agro-chemical doses in field and pot applications; Preparation of solutions of acids; Neutralisation of acid and bases; Preparation of buffers of different strengths and pH values; Use and handling of microscope, laminar flow, vacuum pumps, viscometer, thermometer, magnetic stirrer, micro-ovens, incubators, sand bath, water bath, oil bath; Electric wiring and earthling; Preparation of media and methods of sterilization; Seed viability testing, testing of pollen viability; Tissue culture of crop plants; Description of flowering plants in botanical terms in relation to taxonomy

Suggested Readings

1. Furr AK. 2000. *CRCH and Book of Laboratory Safety*. CRC Press.
2. Gabb MH and Latchem WE. 1968. *A Hand book of Laboratory Solutions*. Chemical Publ. Co.

AGRICULTURAL RESEARCH, RESEARCH ETHICS AND RURAL DEVELOPMENT PROGRAMMES (1+0)

Objective

To enlighten the students about the organization and functioning of agricultural research systems at national and international levels, research ethics, and rural development programmes and policies of Government.

Theory

UNIT I History of agriculture in brief; Global agricultural research system: Need, scope, opportunities; Role in promoting food security, reducing poverty and protecting the environment; National Agricultural Research Systems (NARS) and Regional Agricultural Research Institutions; Consultative Group on International Agricultural Research (CGIAR): International Agricultural Research Centers (IARC), partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels; International fellowships for scientific mobility.

UNIT II Research ethics: Research integrity, research safety in laboratories, welfare of animals used in research, computer ethics, standards and problems in research ethics.

UNIT III Concept and connotations of rural development, rural development policies and strategies; Rural development programmes: Community Development Programme, Intensive Agricultural District Programme, Special group–Area Specific Programme, Integrated Rural Development Programme (IRDP) Panchayati Raj Institutions, Co-operatives, Voluntary Agencies/Non-Governmental Organisations; Critical evaluation of rural development policies and programmes; Constraints in implementation of rural policies and programmes.

Suggested Readings

1. Bhalla GS and Singh G. 2001. *Indian Agriculture-Four Decades of Development*. Sage Publ.
2. Punia MS. *Manual on International Research and Research Ethics.* CCS Haryana Agricultural University, Hisar.
3. Rao BSV. 2007. *Rural Development Strategies and Role of Institutions-Issues, Innovations and Initiatives*. Mittal Publ.
4. Singh K.1998. *Rural Development-Principles, Policies and Management*. Sage Publ.

2.4 Mandatory Requirement of Seminars

- One seminar is mandatory in Masters (One Credit) while there is requirement of two in Doctoral programmes (two Credits).
- The students are encouraged to make presentations on the latest developments and literature in the area of research topic. This will provide training to the students on preparation for seminars, organizing the work, critical analysis of data and presentations skills.

3 Residential Requirements

The minimum and maximum duration of residential requirement for Masters' Degree and Ph.D. Programmes shall be as follows:

P.G. Degree Programmes	Duration of Residential Requirement	
	Minimum	Maximum
Master's Degree	2 Academic Years (4 Semesters)	5 Academic Years (10 Semesters)
Ph.D.	3 Academic Years (6 Semesters)	7 Academic Years (14 Semesters)

In case a student fails to complete the degree programme within the maximum duration of residential requirement, his/ her admission shall stand cancelled. The requirement shall be treated as satisfactory in the cases in which a student submits his/her thesis any time during the 4th and 6th semester of his/her residentship at the University for Masters' and Ph.D. programme, respectively.

4. Guidelines for P.G. and Ph.D. Examinations

- Before start of a semester, list of courses to be offered along with the names of the course leader and course associates will be notified by each division/Hub.
- Each course leader will prepare a lesson plan based on the syllabus indicating the number of classes per unit or topic and to upload in the academic portal.
- Study materials, PPT slides, etc. should be uploaded in the academic portal of the institute before the class for use by the students.
- The class schedule should clearly mention the date of Quiz, Mid-term, and End-Term examination as per Academic Calendar and follow it strictly. Project works may also be given wherever necessary, and the marks should be included in Assignment category.
- There will at least two Quiz examinations for each subject (except practical courses)- one announced and the other one is unannounced.
- The announced Quiz will be conducted as per academic calendar while the date of the unannounced Quiz will be decided by the course leader.
- For effective evaluation of the students, one Quiz should be held before the mid-term examination and the other should be held after the mid-term examination.
- The Quiz examination will be held during normal class time of the course. The setting of Quiz papers, conduction of Quiz examination and evaluation of the answer sheets will be done by the concerned course leader and the course associated faculties.

- Minimum mark for a Quiz examination should not be less than 10. Final weightage for Quiz will be 5% only.

4.1 Mid-term Examination

- The mid-term examination will be held as per the date notified by the Graduate School. Should there be any change, the Graduate School will notify a fresh date for conducting the exam.
- The mid-term examination will be conducted by the Examination Cell of each Hub in consultation with the Hub coordinator(s) and the course leaders.
- Mid-term exam will be held in a common place under the supervision of invigilators unrelated to the subject of the exam; however, the course leader or associate faculty of the subject would visit the examination hall to address issues, doubt, etc. if any, related to the question paper.
- Mid-term answer copies will be evaluated by the faculties associated with the concerned course.
- Total marks for mid-term examination of a subject should not be less than 30 for one hour duration. The duration of the exam should be adjusted with the total marks of the examination.
- Total weightage of internal examination will be 50%. The break-up of 50% weightage to different components will be as follows:

Sl. No.	Course type	Component	Weightage (%)	Setting up of question paper	Evaluation of answer copies
1	Courses with Theory and Practical	Mid-term exam	25	Internal	Internal
		Quiz	5	Internal	Internal
		Assignment	5	Internal	Internal
		Practical	15	Internal	Internal
2	Courses with Theory only	Mid-term examination	35	Internal	Internal
		Quiz	5	Internal	Internal
		Assignment	10	Internal	Internal
3	Courses with Practical only	Practical	100	Internal	Internal

4.2 End-term Examination

- The End-term Examination will be held as per schedule declared in the Academic Calendar. Should there be any change in the date, the Graduate School will notify it accordingly.
- The Examination Cell, ICAR-IARI, New Delhi will prepare a data base of external examiners in consultation with the course leader of various courses. The external examiners for question paper setting should be in the rank of Associate Professor (or equivalent) or above and should be associated with teaching/guiding of students of the same discipline or same/similar courses.
- With the approval of the Dean & Jt. Director (Edn.), the Examination Cell, ICAR-IARI, New Delhi will collect two sets of question papers from the external examiners; one set will be used immediately for conducting the End-term examination and the other set of questions will be reserved for make-up/repeat exam or other eventualities.

- The experts will be provided with the course syllabus and the lesson plan to set the question paper giving corresponding weightage corresponding to the number of lectures delivered on a topic. The questions should cover the entire syllabus.
- Total marks for End-term examination should be 100 and the duration of the examination will be 3 hours. The weightage of the End-term will be 50%.
- The End-term examination paper will have Objective (30%) and Descriptive (70%) questions. The Objective type questions will include True/False, Fill in the blanks, Matching, Simple multiple choice, Multiple choice with pairs of options, Assertion/ Reasoning, Sequence of events, etc.
- A nominal honorarium (at least Rs. 2000 for two sets) will be given to the external experts for setting the question papers.

4.3 Practical Examination

- The Practical Examination will have both written and practical activities including specimen identification, slides preparation and observation under microscope, lab tests, etc. as decided by the concerned faculties.
- Setting of question paper, conduction of practical examination, and viva-voce, and evaluation of the answer copies and the practical note books will be done by the concerned course leader and the faculties associated with the course.
- Total marks for Practical Examination will be 50 for 2-3 hours.

4.4 Comprehensive Examination

- For master's degree program, no comprehensive examination will be held.
- For doctoral program, a student after completing 75% of the courses of the Major and Minor subjects will be eligible for comprehensive examination. However, there will be no written comprehensive examination.
- For initial screening of the students, there will be a prequalifying viva-voce examination to be conducted by a 3–5-member Examination Board constituted by the Professor of the concerned Division/Hub. Only students qualified in the pre- qualifying examinations will be eligible for appearing in the final comprehensive qualifying examination.
- An external examiner not below the rank of Associate Professor or equivalent will be invited by the Graduate School to conduct the comprehensive viva-voce examination.
- For comprehensive viva-voce examination, the student will apply on specific form to the Dean and Jt. Director (Edn.) through the Chairman, Advisory Committee.
- The Chairman will suggest names of three probable external examiners while the Professor of the concerned Division will add two more names, out of which, the Dean and Jt. Director (Edn.) will nominate only one.
- The Graduate School will get consent from the external examiner to conduct the viva-voce examination.
- The viva-voce examination will be conducted by the external examiner in association with the students Advisory Board in presence of the Professor of the concerned Division/Hubs.

- In the qualifying viva-voce, the student should be evaluated thoroughly for his/her knowledge and understanding of his/her major, minor and supporting subjects along with related facts and figures.
- The report of the viva-voce examination should be submitted to the Graduate School through the Academic portal.

4.5 Make-up/Repeat Examination

- If a student fails to appear in an examination (Mid-term, End-term or Practical) due to medical or some other reason(s), the student may appear for a make-up examination as decided by the Graduate School.
- For make-up examination under medical ground, the student has to take medical leave from the institute doctor/ institute approved doctor on the day or prior to the day of the examination.
- For make-up examination under institutional work (participating in a competition representing the institute, educational tour, etc.), the student has to obtain prior permission with an office order from the competent authority.
- The student should apply through the concerned course leader and Hub Coordinator (in case of students from the IARI Academic Hubs) to the Dean and Jt. Director (Edn.) with supporting documents (medical certificate, office order, etc.). Upon satisfaction, the Dean and Jt. Director (Edn.) grant permission to the students to appear for the make-up examination and the Graduate School will issue office order to this effect.
- The student who fails in a subject(s) will appear in the repeat examination.
- The Examination Cell, ICAR-IARI, New Delhi will notify the date of examination and accordingly the concerned course leader will conduct the make-up/repeat examination.
- For mid-term and practical make-up examination, question paper will be set by the concerned course leader in consultation with the associated faculties. For end-term make-up/repeat examination, the question paper will be provided by the Examination Cell, IARI, New Delhi.
- The make-up/repeat examination should be held within 2 months from the last mid-term/end-term/ practical examination held.

4.6 F- Grade Clearance (Repeat Examination)

- If a student fails in a subject(s) and get F grade in a semester, he/she will be promoted to the next semester. However, he/she has to clear the F grade i.e. Pass that/those subject(s) within 2 months from the commencement of the next semester.
- The Examination Cell, ICAR-IARI, New Delhi will notify the date of repeat examinations and the concerned course leader will conduct the examination.
- Question paper for the repeat examination will be provided by the Examination Cell, ICAR-IARI, New Delhi.
- Student who gets F grade in one or more subjects in any semester will not be eligible for Gold Medal or any such awards offered by the Institute.

4.7 Submission of Grades

- Each course leader will upload the grade of each subject within 10 working days from the date of the end-term exam of that subject.

- The Graduate School will declare the final result within 15 working days from the end of the semester.

4.8 Attendance Requirement

- To be eligible to appear in the final examination, 85% attendance, separately in theory and practical classes, will be required.
- An attendance of 85% is also required in the academic or institutional events/activities organized by the Graduate School/Hub where students were asked to attend.
- Upon application through proper channel with supporting documents, the Dean and Jt. Director (Edn.) may grant a maximum of 10% relaxation to the minimum attendance requirements for appearing in an examination.

DISCIPLINE WISE AND SEMESTER WISE DISTRIBUTION OF COURSES AS PER BSMA RECOMMENDATION APPLICABLE FROM ACADEMIC SESSION 2022-23

1. AGRICULTURAL CHEMICALS

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
AC 501	INTRODUCTION TO AGROCHEMICALS	2	0
AC 502	CHEMICAL LABORATORY TECHNIQUES	1	2
AC 503*	BASIC CHEMISTRY	3	1
AC 504*	NATURAL PRODUCT CHEMISTRY	2	1
AC 506*	AGROCHEMICALS FOR INSECT, MITE AND TERMITE MANAGEMENT	2	1
AC 603	ADVANCED ORGANIC CHEMISTRY	2	1
AC 604	PESTICIDE METABOLISM, PERSISTENCE AND DECONTAMINATION	2	1
AC 591	MASTER'S SEMINAR	1	0
AC 691/692	DOCTORAL SEMINAR I/II	1	0
	II-SEMESTER		
AC 505*	AGROCHEMICAL REGULATION, QUALITY CONTROL AND MANAGEMENT	2	0
AC 507	AGROCHEMICALS FOR DISEASE MANAGEMENT	2	1
AC 508	AGROCHEMICALS FOR WEED AND CROP MANAGEMENT	2	1
AC 509	CHROMATOGRAPHIC AND SPECTROSCOPIC TECHNIQUES	2	1
AC 510*	PESTICIDE RESIDUE CHEMISTRY	2	1
AC 601*	AGROCHEMICAL FORMULATION TECHNOLOGY	2	2
AC 602*	CHEMISTRY OF BIOPESTICIDES	2	1
AC 605	TERM PAPER (SPECIAL TOPICS IN AGROCHEMICALS)	1	0
AC 591	MASTER'S SEMINAR	1	0
AC 691/692	DOCTORAL SEMINAR I/II	1	0
Research work			
AC 599	MASTER'S RESEARCH	30	
AC 699	DOCTORAL RESEARCH	75	

***Core course**

2. AGRICULTURAL ECONOMICS

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
AEC-501*	MICRO ECONOMIC THEORY AND APPLICATIONS	3	0
AEC-502*	AGRICULTURAL PRODUCTION ECONOMICS	1	1
AEC-504*	MACRO ECONOMICS AND POLICY	2	0
AEC-506#	AGRICULTURAL DEVELOPMENT AND POLICY ANALYSIS	2	0
AEC-509*	RESEARCH METHODOLOGY FOR SOCIAL SCIENCES	1	1
AEC-510	INDIAN ECONOMY: HISTORY AND CONTEMPORARY ISSUES	2	0
AEC-603*	ADVANCED ECONOMETRICS	2	1
AEC-605	OPERATIONS RESEARCH	2	1
AEC-607#	QUANTITATIVE DEVELOPMENT POLICY ANALYSIS	1	1
AEC-608	NATURAL RESOURCE MANAGEMENT	2	1
AEC-609	ENVIRONMENTAL AND PRICE ANALYSIS ECONOMICS	2	1
AEC-591	MASTER'S SEMINAR	1	0
AEC-660/661	DOCTORAL SEMINAR I/II	1	0
	II-SEMESTER		
AEC-503*	AGRICULTURAL MARKETING AND PRICE ANALYSIS	2	1
AEC-505*	ECONOMETRICS	2	1
AEC-507*	AGRICULTURAL FINANCE AND PROJECT MANAGEMENT	2	1
AEC-508*	LINEAR PROGRAMMING	1	1
AEC-511*	INTERNATIONAL ECONOMICS	1	1
AEC-512	INSTITUTIONAL ECONOMICS	1	0
AEC-513*	NATURAL RESOURCE AND ENVIRONMENTAL ECONOMICS	1	1
AEC-514	COMMODITY FUTURE TRADING	2	0
AEC-515*	DEVELOPMENT ECONOMICS	2	0
AEC-516	RURAL MARKETING	2	0
AEC-517	EVOLUTION OF ECONOMIC THOUGHT	1	0
AEC-601	ADVANCED MICRO ECONOMIC ANALYSIS	1	1
AEC-602	ADVANCED MACROECONOMIC ANALYSIS	2	0
AEC-604	ADVANCED PRODUCTION ECONOMICS	2	1
AEC-606	ADVANCED AGRICULTURAL MARKETING	2	1
AEC-591	MASTER'S SEMINAR	1	0
AEC-660/661	DOCTORAL SEMINAR I/II	1	0
Research Work			
AEC-599	MASTER'S RESEARCH	30	
AEC-699	DOCTORAL RESEARCH	75	

***Core course**

#Additional core course, hence, total 24 credit hours for major course

3. AGRICULTURAL ENGINEERING

COURSE CODE	COURSE NAME	CREDIT -L+P	SEMESTER
FARM MACHINARY POWER ENGINEERING			
FMPE 501*	SOIL DYNAMICS IN TILLAGE AND TRACTION	2+1	1
FMPE 502*	TESTING AND EVALUATION OF AGRICULTURAL EQUIPMENT	2+1	2
FMPE 503*	ERGONOMICS AND SAFETY IN FARM OPERATIONS	2+1	1
FMPE 504	DESIGN OF TRACTOR SYSTEMS	2+1	1
FMPE 505	DESIGN OF FARM MACHINERY-I	2+1	1
FMPE 506	DESIGN OF FARM MACHINERY-II	1+1	2
FMPE 507*	MANAGEMENT OF FARM POWER AND MACHINERY SYSTEM	2+1	2
FMPE 511	PRINCIPLES OF AUTOMATION AND CONTROL	2+1	1
FMPE 512	PRINCIPLES OF HYDRAULIC AND PNEUMATIC SYSTEMS	2+1	2
FMPE 513	APPLIED INSTRUMENTATION IN FARM MACHINERY	2+1	1
FMPE 514	SYSTEMS SIMULATION AND COMPUTER AIDED PROBLEM SOLVING ENENGINEERING	1+1	1
FMPE 515	COMPUTER AIDED DESIGN OF MACHINERY	0+2	2
FMPE 516	ADVANCE MANUFACTURING TECHNOLOGIES	2+0	2
FMPE 517	MACHINERY FOR PRECISION AGRICULTURE	2+1	1
FMPE 518	MACHINERY FOR HORTICULTURE AND PROTECTED AGRICULTURE	2+0	2
FMPE 601*	ADVANCES IN FARM MACHINERY AND POWER ENGINEERING	2+1	1
FMPE 602	ADVANCES IN MACHINERY FOR PRECISION AGRICULTURE	2+1	2
FMPE 603	ENERGY CONSERVATION AND MANAGEMENT INPRODUCTION AGRICULTURE	3+0	2
FMPE 604	MECHANICS OF TILLAGE IN RELATION TO SOIL AND CROP	2+1	1
FMPE 611	MECHANICS OF TRACTION AND ITS APPLICATION	2+1	2
FMPE 612*	FARM MACHINERY MANAGEMENT AND SYSTEMS ENGINEERING	2+1	2
FMPE 613	MACHINERY FOR SPECIAL FARM OPERATIONS	2+1	2
FMPE 614	ERGONOMICS IN WORKING ENVIRONMENT	2+1	1
FMPE 591	MASTER'S SEMINAR	1	1/2
FMPE 691/692	DOCTORAL SEMINAR I/II	1	1/2
Research Work			
FMPE 599	MASTER'S RESEARCH	30	
FMPE 699	DOCTORAL RESEARCH	75	
PROCESSING AND FOOD ENGINEERING			
PFE 501*	TRANSPORT PHENOMENA IN FOOD PROCESSING	2+1	1
PFE 502*	UNIT OPERATIONS IN FOOD PROCESS ENGINEERING	2+1	1
PFE 503*	FIELD CROPS PROCESS ENGINEERING	2+1	2
PFE 504*	HORTICULTURAL CROPS PROCESS ENGINEERING	2+1	2

PFE 505	STORAGE ENGINEERING AND HANDLING OF AGRICULTURAL PRODUCE	2+1	1
PFE 506	FOOD PACKAGE ENGINEERING	1+1	1
PFE 507	INSTRUMENTATION AND SENSORS IN FOOD PROCESSING	2+1	2

PFE 508	APPLICATION OF ENGINEERING PROPERTIES IN FOOD PROCESSING	2+1	2
PFE 509	FOOD QUALITY AND SAFETY	2+1	1
PFE 510	FOOD PROCESSING TECHNOLOGIES	2+1	2
PFE 511	FOOD PROCESSING EQUIPMENT AND PLANT DESIGN	1+1	2
PFE 512	SEED PROCESS ENGINEERING	1+1	2
PFE 513	AGRI-PROJECT PLANNING AND MANAGEMENT	2+1	1
PFE 514	FARM STRUCTURES AND ENVIRONMENTAL CONTROL	2+1	2
PFE 515	DAIRY PRODUCT PROCESSING	2+1	1
PFE 516	PROCESSING OF MEAT, POULTRY AND FISH	2+1	1
PFE 517	DESIGN OF AQUACULTURAL STRUCTURES	2+1	1
PFE 518	THERMAL ENVIRONMENTAL ENGINEERING FOR AGRICULTURAL PROCESSING	2+1	2
PFE 601*	ADVANCES IN FOOD PROCESS ENGINEERING	2+1	1
PFE 602*	DRYING AND DEHYDRATION OF FOOD MATERIALS	2+1	2
PFE 603	TEXTURAL AND RHEOLOGICAL CHARACTERISTICS OF FOOD MATERIALS	2+1	1
PFE 604	AGRICULTURAL WASTE AND BY-PRODUCTS UTILIZATION	2+1	2
PFE 605	MATHEMATICAL MODELING IN FOOD PROCESSING	3+0	1
PFE 606	BIOPROCESS ENGINEERING	2+1	2
PFE 591	MASTER'S SEMINAR	1	1/2
PFE 691/692	DOCTORAL SEMINAR I/II	1	1/2
Research Work			
PFE 599	MASTER'S RESEARCH	30	
PFE 699	DOCTORAL RESEARCH	75	
	SOIL AND WATER CONSERVATION ENGINEERING		
SWCE 501*	ADVANCED SOIL AND WATER CONSERVATION ENGINEERING	2+1	1
SWCE 502*	APPLIED WATERSHED HYDROLOGY	2+1	1
SWCE 503	SOIL AND WATER CONSERVATION STRUCTURES	2+1	2
SWCE 504	STOCHASTIC HYDROLOGY	2+1	1
SWCE 505*	WATERSHED MANAGEMENT AND MODELING	2+1	2
SWCE 506	FLOW THROUGH POROUS MEDIA	2+0	2
SWCE 507/ IDE 507	REMOTE SENSING AND GIS FOR LAND AND WATER RESOURCE MANAGEMENT	2+1	1
SWCE 508	CLIMATE CHANGE AND WATER RESOURCES	3+0	1
SWCE 509	NUMERICAL METHODS IN HYDROLOGY	2+0	2
SWCE510	DRY LAND WATER MANAGEMENT TECHNOLOGIES	2+0	2

SWCE 601*	ADVANCES IN HYDROLOGY	2+1	2
SWCE 602*	SOIL AND WATER SYSTEMS SIMULATION AND MODELING	2+1	1
SWCE 603	RESERVOIR OPERATION AND RIVER BASIN MODELING	2+1	2
SWCE 604	MODELING SOIL EROSION PROCESSES AND SEDIMENTATION	2+1	1
SWCE 605	WASTE WATER TREATMENT AND UTILIZATION	3+0	1
SWCE 606	HYDRO-CHEMICAL MODELING	2+0	2
SWCE 591	MASTER'S SEMINAR	1	1/2
SWCE 691/692	DOCTORAL SEMINAR I/II	1	1/2
Research Work			
SWCE 599	MASTER'S RESEARCH	30	
SWCE 699	DOCTORAL RESEARCH	75	

***Core course**

4. AGRICULTURAL EXTENSION EDUCATION

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
EXT 501*	EXTENSION LANDSCAPE	2	0
EXT 502*	APPLIED BEHAVIOUR CHANGE	2	1
EXT 503*	ORGANISATIONAL BEHAVIOUR AND DEVELOPMENT	2	1
EXT 504*	RESEARCH METHODOLOGY IN EXTENSION	2	1
EXT 505*	CAPACITY DEVELOPMENT	2	1
EXT 511**	FOUNDATIONS OF EXTENSION EDUCATION	2	1
EXT-601*	POLICY ENGAGEMENT AND EXTENSION	2	1
EXT 602*	METHODOLOGIES FOR SOCIAL AND BEHAVIOURAL SCIENCES	2	1
EXT-603*	TECHNOLOGY COMMERCIALIZATION AND INCUBATION	2	1
EXT 608**	ADVANCES IN AGRICULTURAL EXTENSION EDUCATION	2	1
EXT 609**	AGRICULTURAL JOURNALISM	2	1
EXT 591	MASTER'S SEMINAR	1	0
EXT 691/692	DOCTORAL SEMINAR I/II	1	0
	II-SEMESTER		
EXT 506*	ICTS FOR AGRICULTURAL EXTENSION AND ADVISORY SERVICES	2	1
EXT 507*	EVALUATION AND IMPACT ASSESSMENT	2	1
EXT 508	MANAGING EXTENSION ORGANISATIONS	2	1
EXT 509	ENABLING INNOVATION	2	1
EXT 510	GENDER MAINSTREAMING	2	1
EXT 604*	EDUCATIONAL TECHNOLOGY AND INSTRUCTIONAL DESIGN	2	1

EXT 605	RISK MANAGEMENT AND CLIMATE CHANGE ADAPTATION	2	1
EXT 606	LIVELIHOOD DEVELOPMENT	1	**1**
EXT 607	FACILITATION FOR PEOPLE CENTRIC DEVELOPMENT	2	1
EXT 610**	EMERGING TECHNOLOGIES IN AGRICULTURE	2	1
EXT 591	MASTER'S SEMINAR	1	0
EXT 691/692	DOCTORAL SEMINAR I/II	1	0
Research work			
EXT 599	MASTER'S RESEARCH	30	
EXT 699	DOCTORAL RESEARCH	75	

***Core course**
**** New course proposed**

5. AGRICULTURAL PHYSICS

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
AP 501*	BASIC CONCEPTS OF AGRICULTURAL PHYSICS -I	2	1
AP 502*	BASIC CONCEPTS OF AGRICULTURAL PHYSICS -II	3	0
AP 503	FUNDAMENTALS OF SOIL PHYSICS	2	1
AP 504*	MATHEMATICS IN AGRICULTURE	3	0
AP 505	FUNDAMENTALS OF METEOROLOGY	2	1
AP 506*	PRINCIPLES OF BIOPHYSICS	2	1
AP 507	PRINCIPLES OF REMOTE SENSING	2	1
AP 601*	ADVANCED SOIL PHYSICS	2	1
AP 603	CROP MICROMETEOROLOGY AND EVAPOTRANSPIRATION	2	1
AP 604*	DIGITAL IMAGE PROCESSING	1	1
AP 591	MASTER'S SEMINAR	1	0
AP 691/692	DOCTORAL SEMINAR I/II	1	0
	II-SEMESTER		
AP 508	PHYSICS OF SOIL AND WATER CONSERVATION	2	1
AP 509	GENERAL CLIMATOLOGY	2	1
AP 510	SOIL PHYSICAL ENVIRONMENT AND PLANT GROWTH	2	1
AP 511	SIMULATION OF SOIL, PLANT AND ATMOSPHERIC PROCESSES	2	1
AP 512	PRINCIPLES OF PHYSICAL TECHNIQUES IN AGRICULTURE	2	1
AP 513	PRINCIPLES AND APPLICATIONS OF GIS AND GPS	2	1
AP 514	NANOSCIENCE AND TECHNOLOGY FOR AGRICULTURE	2	0
AP 515	REMOTE SENSING IN AGRICULTURE	2	1
AP 602	APPLIED SOIL PHYSICS	2	1
AP 605	SATELLITE AGROMETEOROLOGY	2	1
AP 606	SENSORS FOR SOIL, CROP AND ENVIRONMENT MONITORING	2	1

AP 607	WEATHER HAZARDS AND ITS MANAGEMENT	2	0
AP 591	MASTER'S SEMINAR	1	0
AP 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
AP 599	MASTER'S RESEARCH	30	
AP 699	DOCTORAL RESEARCH	75	

*** Core course**

6. AGRICULTURAL STATISTICS

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
STAT 501	MATHEMATICS FOR APPLIED SCIENCES	2	0
STAT 502	STATISTICAL METHODS FOR APPLIED SCIENCES	3	1
STAT 521	APPLIED REGRESSION ANALYSIS	2	1
STAT 522	DATA ANALYSIS USING STATISTICAL PACKAGES	2	1
STAT 551	MATHEMATICS-I	3	0
STAT 552*	PROBABILITY THEORY	2	0
STAT 553*	STATISTICAL METHODS	2	1
STAT 554	ACTUARIAL STATISTICS	2	0
STAT 555	BIOINFORMATICS	2	0
STAT 556	ECONOMETRICS	2	0
STAT 571*	MULTIVARIATE ANALYSIS	2	1
STAT 572*	REGRESSIONAN ALYSIS	1	1
STAT 573*	STATISTICAL COMPUTING	1	1
STAT 574	TIMESERIES ANALYSIS	1	1
STAT 575	DEMOGRAPHY	2	0
STAT 576	STATISTICAL METHODS FOR LIFE SCIENCES	2	0
STAT 577	STATISTICAL ECOLOGY	2	0
STAT 601*	ADVANCED DATA ANALYTICS	1	2
STAT 602*	SIMULATION TECHNIQUES	1	1
STAT 603*	LINEAR MODELS	2	0
STAT 604*	ADVANCED STATISTICAL METHODS	2	1
STAT 605	MODELING TECHNIQUES FOR FORECASTING	2	1
STAT 606	STOCHASTIC PROCESSES	2	0
STAT 607	SURVIVAL ANALYSIS	2	0
STAT 608	SPATIAL STATISTICS	1	1
STAT 591	MASTER'S SEMINAR	1	0
STAT 691/692	DOCTORAL SEMINAR I/II	1	0
	II-SEMESTER		
STAT 511	EXPERIMENTAL DESIGNS	2	1
STAT 512	BASIC SAMPLING TECHNIQUES	2	1

STAT 561	MATHEMATICS-II	2	0
STAT 562*	STATISTICAL INFERENCE	2	1
STAT 563*	DESIGNOF EXPERIMENTS	2	1
STAT 564*	SAMPLING TECHNIQUES	2	1
STAT 565*	STATISTICAL GENETICS	2	1
STAT 566	STATISTICAL QUALITY CONTROL	2	0
STAT 567	OPTIMIZATION TECHNIQUES	1	1
STAT 610**	ADVANCED STATISTICAL INFERENCE	3	0
STAT 611*	BAYESIAN INFERENCE	2	0
STAT 612	ADVANCED DESIGN OF EXPERIMENTS	2	1
STAT 613	ADVANCED SAMPLING TECHNIQUES	2	1
STAT 614	ADVANCED STATISTICAL GENETICS	2	1
STAT 615	ADVANCED TIME SERIES ANALYSIS	2	0
STAT 616	ADVANCED BIOINFORMATICS	2	0
STAT 617	ADVANCED ECONOMETRICS	2	0
STAT 618	RECENT ADVANCES IN THE FIELD OF SPECIALIZATION	1	0
STAT 591	MASTER'S SEMINAR	1	0
STAT 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
STAT 599	MASTER'S RESEARCH	30	0
STAT 699	DOCTORAL RESEARCH	75	0

***Core Course**
****New course proposed**

7. AGRONOMY

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
AGRON 501*	MODERN CONCEPTS IN CROP PRODUCTION	3	0
AGRON 503*	PRINCIPLES AND PRACTICES OF WEED MANAGEMENT	2	1
AGRON 505	CONSERVATION AGRICULTURE	1	1
AGRON 506	AGRONOMY OF MAJOR CEREALS AND PULSES	2	0
AGRON 508	AGRONOMY OF MEDICINAL, AROMATIC AND UNDER-UTILIZED CROPS	2	1
AGRON 510/ES 510	AGROSTOLOGY AND AGROFORESTRY	2	1
AGRON 511	CROPPING SYSTEM AND SUSTAINABLE AGRICULTURE	2	0
AGRON 569**	INTERNATIONAL AGRICULTURE - ISSUES AND CHALLENGES OF 21ST CENTURY	2	0

AGRON 602*	RECENT TRENDS IN CROP GROWTH AND PRODUCTIVITY	2	1
AGRON 603	IRRIGATION MANAGEMENT	2	1
AGRON 606	SOIL CONSERVATION AND WATERSHED MANAGEMENT	2	1
AGRON 608	RESEARCH AND PUBLICATION ETHICS	2	0
AGRON 550	MASTER'S SEMINAR	1	0
AGRON 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
AGRON 502*	PRINCIPLES AND PRACTICES OF SOIL FERTILITY AND NUTRIENT MANAGEMENT	2	1
AGRON 504*	PRINCIPLES AND PRACTICES OF WATER MANAGEMENT	2	1
AGRON 507	AGRONOMY OF OILSEED, FIBRE AND SUGAR CROPS	2	1
AGRON 509	AGRONOMY OF FODDER AND FORAGE CROPS	2	1
AGRON 512	DRYLAND FARMING AND WATERSHED MANAGEMENT	2	1
AGRON 513	PRINCIPLES AND PRACTICES OF ORGANIC FARMING	2	1
AGRON 601*	CURRENT TRENDS IN AGRONOMY	3	0
AGRON 604	RECENT TRENDS IN WEED MANAGEMENT	2	0
AGRON 605	INTEGRATED FARMING SYSTEMS FOR SUSTAINABLE AGRICULTURE	2	0
AGRON 607	STRESS CROP PRODUCTION	2	1
AGRON 609	EXPERIMENTAL TECHNIQUES IN AGRONOMY	2	1
AGRON 550	MASTER'S SEMINAR	1	0
AGRON 691/692	DOCTORAL SEMINAR I/ II	1	0
Research Work			
AGRON 599	MASTER'S RESEARCH	30	
AGRON 699	DOCTORAL RESEARCH	75	

*** Core course**
**** New course proposed**

8. BIOCHEMISTRY

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
I-SEMESTER			
BIOCHEM 501*	BASIC BIOCHEMISTRY	3	1
BIOCHEM 503*	ENZYMOLOGY	2	1
BIOCHEM 508	ANIMAL BIOCHEMISTRY	3	0
BIOCHEM 509	NUTRITIONAL BIOCHEMISTRY	2	1
BIOCHEM 510	NITROGEN AND SULPHUR METABOLISM	2	1
BIOCHEM 602	ADVANCED MOLECULAR BIOLOGY	3	0
BIOCHEM 603	BIOCHEMISTRY OF BIOTIC AND ABIOTIC STRESSES	3	0
BIOCHEM 604	FRONTIER TOPICS IN BIOCHEMISTRY	2	0

BIOCHEM 606	BIOMEMBRANES	2	0
BIOCHEM 607*	APPLICATIONS OF TECHNIQUES IN BIOCHEMISTRY	1	2
BIOCHEM 591	MASTER'S SEMINAR	1	0
BIOCHEM 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
BIOCHEM 502*	INTERMEDIARY METABOLISM	3	0
BIOCHEM 504	MOLECULAR BIOLOGY	2	1
BIOCHEM 505*	TECHNIQUES IN BIOCHEMISTRY	2	2
BIOCHEM 506	IMMUNO CHEMISTRY	2	1
BIOCHEM 507	PLANT BIOCHEMISTRY	2	1
BIOCHEM 511	BIOCHEMISTRY ON XENOBIOTICS	2	0
BIOCHEM 601*	ADVANCED ENZYMOLOGY	2	1
BIOCHEM 605	CONCEPTS AND APPLICATIONS OF OMICS IN BIOLOGICAL SCIENCE	3	0
BIOCHEM 608**	INDUSTRIAL BIOCHEMISTRY	2	1
BIOCHEM 591	MASTER'S SEMINAR	1	0
BIOCHEM 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
BIOCHEM 699	DOCTORAL RESEARCH	75	
BIOCHEM 599	MASTER'S RESEARCH	30	

***Core course**
**** New course proposed**

9. BIOINFORMATICS

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
I-SEMESTER			
BI 501*	INTRODUCTION TO BIOINFORMATICS & COMPUTATIONAL BIOLOGY	2	1
BI 503	GENOME ASSEMBLY AND ANNOTATION	1	1
BI 504*	BIOMOLECULAR MODELLING AND SIMULATION	2	1
BI 505	TRANSCRIPTOMICS AND METAGENOMICS	2	1
BI 506*	BIOLOGICAL DATA MANAGEMENT	2	1
BI 507	BIOLOGICAL NETWORK MODELLING AND ANALYSIS	2	1
BI 510	GRAPHICS AND VISUALIZATION OF BIOLOGICAL DATA	1	1
BI 605*	COMPARATIVE AND FUNCTIONAL GENOMICS	1	1
BI 606	PHYLOGENETICS	2	1
BI 607**	R AND HIGH DIMENSIONAL GENOME DATA	1	1
BI 608	PHARMACOGENOMICS & IPR	3	1
BI 609	BIOLOGICAL DATA INTEGRATION AND QUALITY CONTROL	1	1

BI 591	MASTER'S SEMINAR	1	0
BI 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
BI 508	COMPUTER PROGRAMMING IN BIOINFORMATICS	2	1
BI 509	MACHINE LEARNING TECHNIQUES IN BIOINFORMATICS	2	1
BIF 511	OPTIMIZATION TECHNIQUES IN BIOINFORMATICS	1	1
BIF 512	PROTEOMICS AND METABOLOMICS	2	1
BI 601*	GENOME WIDE ASSOCIATION STUDY*	2	1
BI 602**	COMPUTATIONAL ANALYSIS OF NON-CODING RNAS	1	1
BI 603**	BIG DATA ANALYTICS	1	1
BI 604**	SYSTEMS BIOLOGY	3	0
BI 610	QUANTUM THEORY AND APPLICATIONS IN BIOINFORMATICS	1	1
BI 502	STATISTICAL GENOMICS	2	1
BI 591	MASTER'S SEMINAR	1	0
BI 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
BI 599	MASTER'S RESEARCH	30	
BI 699	DOCTORAL RESEARCH	75	

*** Core course**

#New course proposed**

10. COMPUTER APPLICATION

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
I-SEMESTER			
MCA 501	COMPUTERS FUNDAMENTALS AND PROGRAMMING	2	1
MCA 502	COMPUTER ORGANIZATION AND ARCHITECTURE	2	0
MCA 513*	MATHEMATICS FOR APPLIED SCIENCES	2	0
MCA 514*	STATISTICAL COMPUTING	1	1
MCA 551*	MATHEMATICAL FOUNDATIONS IN COMPUTER SCIENCE	3	0
MCA 552*	OBJECT ORIENTED PROGRAMMING	2	1
MCA 553*	DESIGN AND ANALYSIS OF ALGORITHMS	2	1
MCA 571*	DATABASE MANAGEMENT SYSTEMS	2	1
MCA 572*	SOFTWARE ENGINEERING	2	0
MCA 573	OPERATING SYSTEM	2	1
MCA 574	COMPILER CONSTRUCTION	2	1
MCA 575	DATA WAREHOUSING AND DATA MINING	2	1
MCA 603	SIMULATION AND MODELING	1	1
MCA 604	INTRODUCTION TO BIG DATA	2	1
MCA 605	INTRODUCTION TO IOT	2	1
MCA 606	MANAGEMENT INFORMATION SYSTEMS	2	0

MCA 591	MASTER'S SEMINAR	1	0
MCA 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
MCA 511	INTRODUCTION TO COMMUNICATION TECHNOLOGIES, COMPUTER NETWORKING AND INTERNET	1	1
MCA 512	INFORMATION TECHNOLOGY IN AGRICULTURE	2	0
MCA 561*	DATA STRUCTURES	2	1
MCA 562*	SYSTEM SOFTWARE AND PROGRAMMING	2	1
MCA 563*	INTERNET TECHNOLOGIES	1	1
MCA 564	BIOINFORMATICS COMPUTING	1	1
MCA 565	SOFT COMPUTING TECHNIQUES	1	1
MCA 601	SPATIAL INFORMATICS, GIS AND REMOTE SENSING	1	1
MCA 602	INTRODUCTION TO COMPUTER GRAPHICS	1	1
MCA 611*	COMPUTER ORIENTED NUMERICAL ANALYSIS	2	1
MCA 612*	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	2	1
MCA 613	MULTIMEDIA AND ITS APPLICATIONS	1	1
MCA 614	KNOWLEDGE BASED SYSTEMS FOR SEMANTIC WEB	1	1
MCA 615*	BIOINFORMATICS COMPUTING	2	0
MCA 591	MASTER'S SEMINAR	1	0
MCA 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
MCA 599	MASTER'S RESEARCH	30	
MCA 699	DOCTORAL RESEARCH	75	

*** Core course**

11. ENTOMOLOGY

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
I-SEMESTER			
ENT 501*	INSECT MORPHOLOGY	2	1
ENT 502*	INSECT ANATOMY AND PHYSIOLOGY	2	1
ENT 503*	INSECT TAXONOMY	2	1
ENT 505*	BIOLOGICAL CONTROL OF INSECT PESTS AND WEEDS	2	1
ENT 509*	PESTS OF FIELD CROPS	2	1
ENT 510*	PESTS OF HORTICULTURE AND PLANTATION CROPS	2	1
ENT 511*	POST HARVEST ENTOMOLOGY	2	1
ENT 515	TECHNIQUES IN PLANT PROTECTION	0	1
ENT 516	APICULTURE	2	1
ENT 517	SERICULTURE	2	1
ENT 518	LAC CULTURE	2	1
ENT 520/ NEMA 514	PLANT QUARANTINE, BIOSAFETY AND BIOSECURITY	2	0
ENT 521	EDIBLE AND THERAPEUTIC INSECTS	1	1
ENT 522	MEDICAL AND VETERINARY ENTOMOLOGY	1	1
ENT 523	FOREST ENTOMOLOGY	1	1
ENT 601*	INSECT PHYLOGENY AND SYSTEMATICS	1	2

ENT 603*	INSECT ECOLOGY AND DIVERSITY	1	2
ENT 604*	INSECT BEHAVIOUR	1	1
ENT 606*	INSECT TOXICOLOGY AND RESIDUES	1	2
ENT 607	PLANT RESISTANCE TO INSECTS	1	1
ENT 608	ACAROLOGY	1	1
ENT 609	MOLECULAR ENTOMOLOGY	1	1
ENT 610	INTEGRATED PEST MANAGEMENT	2	0
ENT 591	MASTER'S SEMINAR	1	0
ENT 691/692	DOCTORAL SEMINAR I /II	1	0
II-SEMESTER			
ENT 504*	INSECT ECOLOGY	2	1
ENT 506*	TOXICOLOGY OF INSECTICIDES	2	1
ENT 507*	HOST PLANT RESISTANCE	1	1
ENT 508*	CONCEPTS OF INTEGRATED PEST MANAGEMENT	2	0
ENT 510*	PESTS OF HORTICULTURE AND PLANTATION CROPS	2	1
ENT 512	INSECT VECTORS OF PLANT PATHOGENS	2	1
ENT 513	PRINCIPLES OF ACAROLOGY	2	1
ENT 514	VERTEBRATE PEST MANAGEMENT	2	1
ENT 519	MOLECULAR APPROACHES IN ENTOMOLGOY	2	1
ENT 602*	INSECT PHYSIOLOGY AND NUTRITION	1	2
ENT 605*	BIO-INPUTS FOR PEST MANAGEMENT	1	2
ENT 591	MASTER'S SEMINAR	1	0
ENT 691/692	DOCTORAL SEMINAR I /II	1	0
Research Work			
ENT 599	MASTER'S RESEARCH	30	
ENT 699	DOCTORAL RESEARCH	75	

***Core course**

12. ENVIRONMENTAL SCIENCES

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
I-SEMESTER			
ES 501*	INTRODUCTION TO ENVIRONMENTAL SCIENCES	2	1
ES 502*	ENVIRONMENTAL CHEMISTRY	2	1
ES 503*	CLIMATE CHANGE AND CLIMATE SMART AGRICULTURE	2	1
ES 504*	INSTRUMENTAL METHODS FOR ENVIRONMENTAL MONITORING	2	1
ES 506	ENVIRONMENTAL POLLUTION	2	1
ES 601*	ANALYSIS OF AGROECOSYSTEM	2	1
ES 602*	ENVIRONMENTAL IMPACT ASSESSMENT	2	1
ES 603	WASTE MANAGEMENT	2	1
ES 604	CROP GEOGRAPHY AND ECOLOGY	2	1
ES 591	MASTER'S SEMINAR	1	0
ES 691/692	DOCTORAL SEMINAR I/II	1	0

	II-SEMESTER		
ES 505	ENVIRONMENTAL ENGINEERING	2	1
ES 507	ENVIRONMENTAL MICROBIOLOGY AND ECOLOGY	2	1
ES 508	BIOFULES AND ENVIRONMENTAL PROTECTION	2	1
ES 509	ENVIRONMENTAL TOXICOLOGY	2	1
ES 510/ AGRON 510	AGROSTOLOGY AND AGROFORESTRY	2	1
ES 511	ENVIRONMENTAL GEOSCIENCES	2	0
ES 605	BIODIVERSITY	2	1
ES 606/SWE 606	PLANT GROWTH MODELING AND SIMULATION OF ECOLOGICAL PROCESSES	2	1
ES 607	INTRODUCTION TO ENVIRONMENT LAW AND POLICY	2	1
ES 591	MASTER'S SEMINAR	1	0
ES 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
ES 599	MASTER'S RESEARCH	30	
ES 699	DOCTORAL RESEARCH	75	

***Core course**

13. FLORICULTURE AND LANDSCAPING

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
I-SEMESTER			
FLS 501*	SYSTEMATIC OF ORNAMENTAL PLANTS	2	1
FLS 502*	BREEDING OF ORNAMENTAL PLANTS	2	1
FLS 504*	COMMERCIAL PRODUCTION OF LOOSE FLOWERS	2	1
FLS 505*	ORNAMENTAL GARDENING AND LANDSCAPING	2	1
FLS 509	VALUE ADDITION IN FLORICULTURE	2	1
FLS 512	SEED PRODUCTION IN FLOWER CROPS	1	1
FSC 515/VSC 515/FLS 515**	BASIC HORTICULTURE	2	1
FLS 601*	CROP REGULATION IN ORNAMENTAL CROPS	1	1
FLS 602*	POST HARVEST BIOLOGY OF FLORICULTURAL CROPS	2	1
FLS 604	BIOTECHNOLOGICAL APPROACHES IN FLORICULTURAL CROPS	2	1
FLS 605*	ADVANCES IN LANDSCAPING	1	1
FLS 608	CURRENT TRENDS IN PRODUCTION TECHNOLOGY OF FLORICULTURAL CROPS	2	1
FLS 591	MASTER'S SEMINAR	1	0
FLS 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
FLS 503*	COMMERCIAL PRODUCTION OF CUT FLOWERS	2	1
FLS 506	INDOOR PLANTS AND INTERIORSCAPING	1	1
FLS 507	NURSERY MANAGEMENT IN ORNAMENTAL PLANTS	2	1

FLS 508	TURF GRASS MANAGEMENT	2	1
FLS 510	PROTECTED CULTIVATION OF FLOWER CROPS	2	1
FLS 511	CAD FOR LANDSCAPING	1	2
FLS 603	SPECIALITY FLOWERS, FILLERS AND CUT GREENS	1	1
FLS 606	VERTICAL GARDENING	1	2
FLS 607	MODERN APPROACHES IN BREEDING OF FLORICULTURAL CROPS	2	1
FLS 609	RECENT DEVELOPMENTS IN PROTECTED CULTIVATION OF FLORICULTURAL CROPS	2	1
FLS 591	MASTER'S SEMINAR	1	0
FLS 691/692	DOCTORAL SEMINAR-I/II	1	0
Research Work			
FLS 599	MASTER'S RESEARCH	30	
FLS 699	DOCTORAL RESEARCH	75	

***Core course**

****New course proposed**

14. FRUIT SCIENCE

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
FSC 501*	TROPICAL FRUIT PRODUCTION	2	1
FSC 503*	PROPAGATION AND NURSERY MANAGEMENT OF FRUIT CROPS	2	1
FSC 505	SYSTEMATICS OF FRUIT CROPS	2	1
FSC 506	CANOPY MANAGEMENT IN FRUIT CROPS	1	1
FSC 510	ORGANIC FRUIT CULTURE	2	1
FSC 512	CLIMATE CHANGE AND FRUIT CROPS	1	0
FSC 515/VSC 515/ FLS 515**	BASIC HORTICULTURE	2	1
FSC 601*	INNOVATIVE APPROACHES IN FRUIT BREEDING	3	0
FSC 602*	MODERN TRENDS IN FRUIT PRODUCTION	3	0
FSC 606	ABIOTIC STRESS MANAGEMENT IN FRUIT CROPS	2	1
FSC 607	BIODIVERSITY AND CONSERVATION OF FRUIT CROPS	2	1
FSC 591	MASTER'S SEMINAR	1	0
FSC 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
FSC 502*	SUB-TROPICAL AND TEMPERATE FRUIT PRODUCTION	2	1
FSC 504*/GPB 514**	BREEDING OF FRUIT CROPS	2	1
FSC 507	GROWTH AND DEVELOPMENT OF FRUIT CROPS	2	1
FSC 508	NUTRITION OF FRUIT CROPS	2	1
FSC 509	BIOTECHNOLOGY OF FRUIT CROPS	2	1
FSC 511	EXPORT ORIENTED FRUIT PRODUCTION	2	1
FSC 513	MINOR FRUIT PRODUCTION	2	1

FSC 603	RECENT DEVELOPMENTS IN GROWTH REGULATION	3	0
FSC 604	ADVANCED LABORATORY TECHNIQUES	1	2
FSC 605	ARID AND DRY LAND FRUIT PRODUCTION	2	0
FSC 608	SMART FRUIT PRODUCTION	2	0
FSC 591	MASTER'S SEMINAR	1	0
FSC 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
FSC 599	MASTER'S RESEARCH	30	
FSC 699	DOCTORAL RESEARCH	75	

*Core course

**New course proposed

15. GENETICS AND PLANT BREEDING

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
GPB 501*#	PRINCIPLES OF GENETICS	2	1
GPB 502*	PRINCIPLES OF PLANT BREEDING	2	1
GPB 505*	PRINCIPLES OF CYTOGENETICS	2	1
GPB 508	MUTAGENESIS AND MUTATION BREEDING	2	1
GPB 511	CROP BREEDING-I (KHARIF CROPS)	2	1
GPB 517	GERMPLASM CHARACTERIZATION AND EVALUATION	1	1
GPB 518	GENETIC ENHANCEMENT FOR PGR UTILIZATION	1	1
GPB 601*	ADVANCES IN PLANT BREEDING SYSTEMS	3	1
GPB 602	ADVANCES IN BIOMETRICAL GENETICS	2	1
GPB 591	MASTER'S SEMINAR	1	0
GPB 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
GPB 501*#	PRINCIPLES OF GENETICS	2	1
GPB 503*	FUNDAMENTALS OF QUANTITATIVE GENETICS	2	1
GPB 504	VARIETAL DEVELOPMENT AND MAINTENANCE BREEDING	1	1
GPB 506*	MOLECULAR BREEDING AND BIOINFORMATICS	2	1
GPB 507	BREEDING FOR QUALITY AND SPECIAL TRAITS	2	1
GPB 509	HYBRID BREEDING	2	1
GPB 510	SEED PRODUCTION AND CERTIFICATION	1	1
GPB 512	CROP BREEDING-II (RABI CROPS)	2	1
GPB 513	BREEDING VEGETABLE CROPS	2	1
GPB 514/ FSC 504	BREEDING FRUIT CROPS	2	1
GPB 515/ MBB 511	BREEDING ORNAMENTAL CROPS/ MOLECULAR PLANT BREEDING	2	1
GPB 516	BREEDING FOR STRESS RESISTANCE AND CLIMATE CHANGE	2	1

GPB 519**	DEVELOPMENT OF GENE CONCEPT	3	0
GPB 520**	PLANT GENE EXPRESSION AND REGULATION	3	0
GBP 604	PLANT GENETICS RESOURCES, CONSERVATION AND UTILIZATION	1	1
GPB 606	POPULATION GENETICS	2	0
GPB 607	CROP EVOLUTION	3	0
GPB 608	BREEDING DESIGNER CROPS	1	1
GPB 609*	IPR AND REGULATORY MECHANISM (E-COURSE)	1	0
GPB 610**	DEVELOPMENT OF GENE CONCEPT	3	0
GPB 611**	PLANT GENE EXPRESSION AND REGULATION	3	0
GPB 612**	GENETIC DATA ANALYSIS	0	2
GPB 591	MASTER'S SEMINAR	1	0
GPB 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
GPB 599	MASTER'S RESEARCH	30	
GPB 699	DOCTORAL RESEARCH	75	

***Core course**

**** New course proposed**
#GPB 501 in Ist semester offered for GPB, SST, PGR, MBB & VSC and IInd semester for other disciplines

16. MICROBIOLOGY

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
MICRO 501	TECHNIQUES IN MICROBIOLOGY	0	2
MICRO 502*	PRINCIPLES OF MICROBIOLOGY	3	1
MICRO 503*	MICROBIAL PHYSIOLOGY AND METABOLISM	3	1
MICRO 505*	SOIL MICROBIOLOGY	2	1
MICRO 510	INDUSTRIAL MICROBIOLOGY	2	1
MICRO 512	CYANOBACTERIAL AND ALGAL BIOTECHNOLOGY	2	0
MICRO 603*	RECENT DEVELOPMENTS IN SOIL MICROBIOLOGY	2	0
MICRO 604	RECENT APPROACHES IN ENVIRONMENTAL MICROBIOLOGY	2	0
MICRO 605*	PLANT-MICROBE INTERACTIONS	2	1
MICRO 591	MASTER'S SEMINAR	1	0
MICRO 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
MICRO 504	MICROBIAL GENETICS	2	1
MICRO 507*	FOOD MICROBIOLOGY	2	1
MICRO 509	ENVIRONMENTAL MICROBIOLOGY	2	1
MICRO 511*	BIOFERTILIZER TECHNOLOGY	2	1

MICRO 601*	IMPROVEMENT IN FERMENTATION TECHNOLOGY	2	1
MICRO 602	MICROBIAL PHYSIOLOGY AND REGULATION	2	0
MICRO 606	MICROBIAL GENOMICS AND METABOLOMICS	2	0
MICRO 591	MASTER'S SEMINAR	1	0
MICRO 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
MICRO 599	MASTER'S RESEARCH	30	
MICRO 699	DOCTORAL RESEARCH	75	

*** Core course**

17. MOLECULAR BIOLOGY AND BIOTECHNOLOGY

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
MBB 501*	PRINCIPLES OF BIOTECHNOLOGY	3	0
MBB 502*	FUNDAMENTALS OF MOLECULAR BIOLOGY	3	0
MBB 504*	TECHNIQUES IN MOLECULAR BIOLOGY I	0	3
MBB 509	PLANT TISSUE CULTURE	2	1
MBB 510	MICROBIAL AND INDUSTRIAL BIOTECHNOLOGY	2	1
MBB 514	NANO-BIOTECHNOLOGY	2	1
MBB 515	ENVIRONMENTAL BIOTECHNOLOGY	3	0
MBB 518	GENE REGULATION	2	0
MBB 601*	PLANT MOLECULAR BIOLOGY	3	0
MBB 603	PLANT OMICS AND MOLECULAR BREEDING	3	0
MBB 604	COMMERCIAL PLANT TISSUE CULTURE	2	0
MBB 607	PLANT HORMONES AND SIGNALING	2	0
MBB 608	COMPUTATIONAL AND STATISTICAL TOOLS IN BIOTECHNOLOGY	2	1
MBB 591	MASTER'S SEMINAR	1	0
MBB 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
MBB 503*	MOLECULAR CELL BIOLOGY	3	0
MBB 505*	OMICS AND SYSTEM BIOLOGY	2	1
MBB 506	PLANT GENETIC ENGINEERING	3	0
MBB 507	TECHNIQUES IN MOLECULAR BIOLOGY II	0	3
MBB 508	INTRODUCTION TO BIOINFORMATICS	2	1
MBB 511	MOLECULAR PLANT BREEDING	2	1
MBB 512	IPR, BIOSAFETY & BIOETHICS	2	0
MBB 513	IMMUNOLOGY AND MOLECULAR DIAGNOSTICS	3	0
MBB 516	BIO-ENTREPRENEURSHIP	1	0
MBB 517	STRESS BIOLOGY AND GENOMICS	2	0
MBB 602*	PLANT GENOME ENGINEERING	3	0
MBB 605	PLANT MICROBE INTERACTION	2	0

MBB 606	RNA BIOLOGY	1	0
MBB 591	MASTER'S SEMINAR	1	0
MBB 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
MBB 599	MASTER'S RESEARCH	30	
MBB 699	DOCTORAL RESEARCH	75	

***Core course**

18. NEMATOLOGY

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
I-SEMESTER			
NEMA 501*/ PL PATH 504	PRINCIPLES OF NEMATOLOGY/ PLANT NEMATOLOGY	2	1
NEMA 503*	STRUCTURAL ORGANISATION OF NEMATODES	2	1
NEMA 504*	NEMATODE SYSTEMATICS	2	1
NEMA 505*	NEMATOLOGICAL TECHNIQUES	1	2
NEMA 506*	NEMATODE DISEASES OF CROPS	3	1
NEMA 507	NEMATODE BIOLOGY AND PHYSIOLOGY	2	1
NEMA 508	NEMATODE ECOLOGY	2	1
NEMA 511	BENEFICIAL NEMATODES	1	1
NEMA 512	PRINCIPLES OF INTEGRATED PEST MANAGEMENT	1	1
NEMA 513	DISEASE RESISTANCE IN PLANTS	2	0
NEMA 514/ENT 520	PLANT QUARANTINE, BIOSAFETY AND BIOSECURITY	2	0
NEMA 602*	NEMATODE DISEASES DEVELOPMENT AND HOST RESISTANCE	2	1
NEMA 603*	ADVANCES IN NEMATODE MANAGEMENT	2	1
NEMA 591	MASTER'S SEMINAR	1	0
NEMA 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
NEMA 502	PRINCIPLES OF TAXONOMY	2	0
NEMA 510*	NEMATODE MANAGEMENT	2	1
NEMA 509	NEMATODE INTERACTIONS WITH OTHER ORGANISMS	2	1
NEMA 515	IPM IN PROTECTED CULTIVATION	2	1
NEMA 601*	NEMATODE PHYLOGENY AND SYSTEMATICS	2	1
NEMA 607	ADVANCES IN NEMATOLOGICAL TECHNIQUES	1	1
NEMA 604*	PHYSIOLOGICAL AND MOLECULAR NEMATOLOGY	2	1
NEMA 605/PL PATH 606	PLANT BIOSECURITY AND BIOSAFETY	2	0
NEMA 591	MASTER'S SEMINAR	1	0
NEMA 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
NEMA 599	MASTER'S RESEARCH	30	
NEMA 699	DOCTORAL RESEARCH	75	

***Core course**

19. PLANT GENETIC RESOURCES

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
I- SEMESTER			
PGR 501*	GERMPLASM EXPLORATION AND PLANT SYSTEMATICS	2	1
PGR 502*	PLANT DIVERSITY AND CONSERVATION	2	1
PGR 503*/GPB 517**	GERMPLASM CHARACTERIZATION AND EVALUATION	1	1
PGR 504/GPB 518	GENETIC ENHANCEMENT FOR PGR UTILIZATION	1	1
PGR 505*	ECONOMIC BOTANY	2	1
PGR 512	CONCEPTS IN CONSERVATION GENETICS	1	1
PGR 513**	GERMPLASM MANAGEMENT USING IN VITRO AND CRYOPRESERVATION TECHNIQUES	2	1
PGR 601*/SST 608	RECENT ADVANCES IN GERMPLASM CONSERVATION/ GERMPLASM CONSERVATION TECHNIQUES	1	1
PGR 603*	ECONOMIC BOTANY AND CROP DIVERSIFICATION	1	1
PGR 605	MOLECULAR POPULATION GENETICS IN PGR MANAGEMENT	2	1
PGR 608	GENOMIC TOOLS AND CURRENT APPLICATIONS	2	1
PGR 591	MASTER'S SEMINAR	1	0
PGR 691/692	DOCTORAL SEMINAR I/II	1	0
II- SEMESTER			
PGR 506	INFORMATION MANAGEMENT IN PGR	1	1
PGR 507*	PGR EXCHANGE AND QUARANTINE	2	1
PGR 508	GENOMICS IN PGR MANAGEMENT	1	1
PGR 509	PLANT BIOSECURITY	1	0
PGR 510	PRINCIPLES OF GENETICS FOR PGR MANAGEMENT	2	0
PGR 511	PRINCIPLES OF PLANT BREEDING FOR PGR MANAGEMENT	1	1
PGR 602*/GPB 604	PHENOMICS AND GENOMICS FOR PGR UTILIZATION/ PLANT GENETICS RESOURCES, CONSERVATION AND UTILIZATION	1	1
PGR 604	PGR POLICIES AND REGULATORY MECHANISMS	1	
PGR 606	PLANT TAXONOMY, ECOGEOGRAPHY AND ECOLOGY	1	1
PGR 607	IN SITU-ON FARM CONSERVATION	1	1
PGR 609*	INTELLECTUAL PROPERTY RIGHTS AND REGULATORY MECHANISMS (E-COURSE)	1	
PGR 591	MASTER'S SEMINAR	1	0
PGR 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
PGR 599	MASTER'S RESEARCH	30	
PGR 699	DOCTORAL RESEARCH	75	

***Core course**

****New course proposed**

20. PLANT PATHOLOGY

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
PL PATH 501*	MYCOLOGY	2	1
PL PATH 502	PLANT VIROLOGY	2	1
PL PATH 503	PLANT PATHOGENIC PROKARYOTES	2	1
PL PATH 504/ NEMA 501	PLANT NEMATOLOGY/PRINCIPLES OF NEMATOLOGY	2	1
PL PATH 505	PRINCIPLES OF PLANT PATHOLOGY	2	1
PL PATH 506	TECHNIQUES IN DETECTION AND DIAGNOSIS OF PLANT DISEASES	0	2
PL PATH 508	EPIDEMIOLOGY AND FORECASTING OF PLANT DISEASES	1	0
PL PATH 509	DISEASE RESISTANCE IN PLANTS	2	0
PL PATH 510	ECOLOGY OF SOIL-BORNE PLANT PATHOGENS	1	1
PL PATH 511	CHEMICALS AND BOTANICALS IN PLANT DISEASE MANAGEMENT	2	1
PL PATH 604*	MOLECULAR BASIS OF HOST-PATHOGEN INTERACTION	2	1
PL PATH 605	PRINCIPLES AND PROCEDURES OF CERTIFICATION	1	0
PL PATH 606/ NEMA 605	PLANT BIO SECURITY AND BIO SAFETY	2	0
PLPATH 591	MASTER'S SEMINAR	1	0
PL PATH 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
PL PATH 507	PRINCIPLES OF PLANT DISEASE MANAGEMENT	2	1
PL PATH 512	DETECTION AND MANAGEMENT OF SEED BORNE PATHOGENS	2	1
PL PATH 513	BIOLOGICAL CONTROL OF PLANT DISEASES	1	1
PL PATH 514	INTEGRATED DISEASE MANAGEMENT	2	1
PL PATH 515*	DISEASES OF FIELD AND MEDICINAL CROPS	2	1
PL PATH 516	DISEASES OF FRUITS, PLANTATION AND ORNAMENTAL CROPS	2	1
PL PATH 517	DISEASES OF VEGETABLE AND SPICES CROPS	2	1
PL PATH 518	POST HARVEST DISEASES	2	1
PL PATH 519	PLANT QUARANTINE AND REGULATORY MEASURES	1	0
PL PATH 601	ADVANCES IN MYCOLOGY	2	1
PL PATH 602	ADVANCES IN VIROLOGY	2	1
PL PATH 603	ADVANCES IN PLANT PATHOGENIC PROKARYOTES	2	1
PLPATH 591	MASTER'S SEMINAR	1	0
PL PATH 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
PL PATH 599	MASTER'S RESEARCH	30	
PL PATH 699	DOCTORAL RESEARCH	70	

***Core course**

21. PLANT PHYSIOLOGY

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
PP 501*	PRINCIPLES OF PLANT PHYSIOLOGY - I: PLANT WATER RELATIONS AND MINERAL NUTRITION	2	1
PP 503*	PLANT DEVELOPMENTAL BIOLOGY: PHYSIOLOGICAL AND MOLECULAR BASIS	2	1
PP 506	PHYSIOLOGICAL AND MOLECULAR MECHANISMS OF MINERAL NUTRIENT ACQUISITION AND THEIR FUNCTIONS	2	1
PP 507	PHOTOSYNTHETIC PROCESSES, CROP GROWTH AND PRODUCTIVITY AND CONCEPTS OF CROP MODELLING	2	1
PP 510*	SEED PHYSIOLOGY	2	1
PP 601	FUNCTIONAL GENOMICS AND GENES ASSOCIATED WITH A FEW PHYSIOLOGICAL PROCESSES	2	0
PP 602*	SIGNAL PERCEPTIONS AND TRANSDUCTION AND REGULATION OF PHYSIOLOGICAL PROCESSES	2	0
PP 603	MOLECULAR APPROACHES FOR IMPROVING PHYSIOLOGICAL MECHANISMS THROUGH TRAIT INTROGRESSION	2	1
PP 604	PLANT PHENOMICS – NEXT GENERATION PHENOMICS PLATFORMS	2	0
PP 605	EXPERIMENTAL TECHNIQUES TO CHARACTERIZE PLANT PROCESSES FOR CROP IMPROVEMENT	0	2
PP 591	MASTER'S SEMINAR	1	0
PP 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
PP 502*	PRINCIPLES OF PLANT PHYSIOLOGY-II: METABOLIC PROCESSES AND GROWTHREGULATION	2	1
PP 504	PHYSIOLOGICAL AND MOLECULAR RESPONSES OF PLANTS TO ABIOTIC STRESSES	2	1
PP 505	HORMONAL REGULATION OF PLANT GROWTH AND DEVELOPMENT	2	1
PP 508	PHYSIOLOGY OF FIELD CROPS	2	0
PP 509	PHYSIOLOGY OF HORTICULTURE CROPS	2	0
PP 511	PHENOTYPING PHYSIOLOGICAL PROCESSES	2	0
PP 512	CROP GROWTH REGULATION AND MANAGEMENT	2	0
PP 606	GLOBAL CLIMATE CHANGE AND CROP RESPONSE	2	0
PP 607*	PHYSIOLOGICAL AND MOLECULAR ASPECTS OF SOURCE-SINK CAPACITY FOR ENHANCING YIELD	3	0
PP 608	SEED AND FRUIT GROWTH AND THEIR QUALITY IMPROVEMENT	2	0
PP 609	PLANT-MICROBE INTERACTIONS	2	1
PP 610	WEED BIOLOGY AND PHYSIOLOGY OF HERBICIDE ACTION	2	0
PP 591	MASTER'S SEMINAR	1	0

PP 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
PP 599	MASTER'S RESEARCH	30	
PP 699	DOCTORAL RESEARCH	75	

***Core course**

22. POST HARVEST MANAGEMENT

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
PHM 501*	POSTHARVEST MANAGEMENT OF HORTICULTURAL CROPS	2	1
PHM 502*	POSTHARVEST PHYSIOLOGY AND BIOCHEMISTRY OF PERISHABLES	2	1
PHM 505*	PRINCIPLES AND METHODS OF FRUIT AND VEGETABLE PRESERVATION	2	1
PHM 506	LABORATORY TECHNIQUES IN POSTHARVEST MANAGEMENT	1	2
PHM 508	QUALITY ASSURANCE, SAFETY AND SENSORY EVALUATION OF FRESH AND PROCESSED HORTICULTURAL PRODUCE	2	1
PHM 515/ FSC 515/ VSC 515/ FLS 515**	BASIC HORTICULTURE	2	1
PHM 601*	RIPENING AND SENESCENCE OF FRUITS AND VEGETABLES	1	1
PHM 602*	RECENT TRENDS IN FOOD PRESERVATION	1	1
PHM 603*	MANAGEMENT AND UTILIZATION OF HORTICULTURAL PROCESSING WASTE	3	0
PHM 606	FOOD ADDITIVES	1	1
PHM 591	MASTER'S SEMINAR	1	0
PHM 691/692	DOCTORAL SEMINAR I/II	1	0
	II-SEMESTER		
PHM 503	PACKAGING AND STORAGE OF FRESH HORTICULTURAL PRODUCE	1	1
PHM 504	PACKAGING AND STORAGE OF PROCESSED HORTICULTURAL PRODUCE	1	1
PHM 507*	PROCESSING OF HORTICULTURAL PRODUCE	2	2
PHM 509	FUNCTIONAL FOODS FROM HORTICULTURAL PRODUCE	2	0
PHM 510	MARKETING AND ENTREPRENEURSHIP IN POSTHARVEST HORTICULTURE	1	1
PHM604*	SUPPLY CHAIN MANAGEMENT OF PERISHABLES	2	0
PHM 605	EXPORT ORIENTED HORTICULTURE	1	1
PHM 607	ADVANCES IN PROCESSING OF PLANTATION, SPICES, MEDICINAL AND AROMATIC PLANTS	3	0

PHM608	VALUE ADDITION IN ORNAMENTAL CROPS	1	1
PHM 591	MASTER'S SEMINAR	1	0
PHM 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
PHM 599	MASTER'S RESEARCH	30	
PHM 699	DOCTORAL RESEARCH	75	

***Core course**

****New course proposed**

23. SEED SCIENCE AND TECHNOLGOY

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
I-SEMESTER			
SST 501*	SEED DEVELOPMENTAL BIOLOGY	1	1
SST 502	SEED DORMANCY AND GERMINATION	1	1
SST 503*	SEED PRODUCTION PRINCIPLES AND TECHNIQUESIN FIELD CROPS	2	1
SST 504*	SEED PRODUCTION PRINCIPLES AND TECHNIQUES IN VEGETABLE CROPS	2	1
SST 505	SEED PRODUCTION TECHNIQUES IN FRUITS, FLOWERS SPICES, PLANTATION AND MEDICINAL CROPS	2	1
SST 506	SEED PRODUCTION TECHNIQUES IN FORAGE PASTURE AND GREEN MANURE CROPS	1	1
SST 510	SEED TECHNOLOGY OF TREE SPECIES	1	1
SST 601*	HYBRID SEED PRODUCTION TECHNOLOGY	2	1
SST 602	ORGANIC SEED PRODUCATION	1	1
SST 604*	GENETIC PURITY AND DUS TESTING	2	1
SST 608	GERMPLASM CONSERVATION TECHNIQUES	1	1
SST 610	SEED PLANNING, TRADE AND MARKETING	1	1
SST 591	MASTER'S SEMINAR	1	0
SST 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
SST 507*	SEED LEGISLATION AND CERTIFICATION	2	1
SST 508*	POST HARVEST HANDLING AND STORAGE OF SEEDS	2	1
SST 509*	SEED QUALITY TESTING AND ENHANCEMENT	1	1
SST 511	SEED INDUSTRY AND MARKETING MANAGEMENT	1	1
SST 512	SEED HEALTH TESTING AND MANAGEMENT	1	1
SST 603	PHYSIOLOGY AND BIOCHEMISTRY OF SEEDS	1	1
SST 605	SEED VIGOUR AND CROP PRODUCTIVITY	1	1
SST 606*	ADVANCES IN SEED SCIENCE	2	0
SST 607	ADVANCES IN SEED QUALITY ENHANCEMENT	1	1
SST 609	SEED ECOLOGY	1	1
SST 591	MASTER'S SEMINAR	1	0

SST 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
SST 599	MASTER'S RESEARCH	30	
SST 699	DOCTORAL RESEARCH	75	

*** Core course**

24. SOIL SCIENCE

COURSE CODE	COURSE NAME	CREDIT-L	CREDIT-P
	I-SEMESTER		
SOIL 501*/AP 503	SOIL PHYSICS/ FUNDAMENTALS OF SOIL PHYSICS	2	1
SOIL 502*	SOIL FERTILITY AND FERTILIZER USE	2	1
SOIL 503*	SOIL CHEMISTRY	2	1
SOIL 504*	SOIL MINERALOGY, GENESIS AND CLASSIFICATION	2	1
SOIL 509/AP 515	REMOTE SENSING AND GIS TECHNIQUE FOR SOIL AND CROP STUDIES/ REMOTE SENSING IN AGRICULTURE	2	1
SOIL 605	BIOCHEMISTRY OF SOIL ORGANIC MATTER	2	0
SOIL 606	SOIL RESOURCE MANAGEMENT	3	0
SOIL 607	MODELING OF SOIL PLANT SYSTEM	2	0
SOIL 609	RECENT TRENDS IN SOIL MICROBIAL BIODIVERSITY	2	1
SOIL 611	SOIL CHEMICAL ENVIRONMENT AND PLANT GROWTH	2	1
SOIL 612	SOIL TESTING AND FERTILIZER RECOMMENDATION	2	1
SOIL 591	MASTER'S SEMINAR	1	0
SOIL 691/692	DOCTORAL SEMINAR I/II	1	0
	II-SEMESTER		
SOIL 505	SOIL EROSION AND CONSERVATION	2	1
SOIL 506*	SOIL BIOLOGY AND BIOCHEMISTRY	2	1
SOIL 507	RADIOISOTOPES IN SOIL AND PLANT STUDIES	1	1
SOIL 508	SOIL, WATER AND AIR POLLUTION	2	1
SOIL 510	ANALYTICAL TECHNIQUES AND INSTRUMENTAL METHODS IN SOIL AND PLANT ANALYSIS	0	2
SOIL 511	MANAGEMENT OF PROBLEMATIC SOILS AND WATER	1	1
SOIL 512	LAND DEGRADATION AND RESTORATION	1	0
SOIL 513	SOIL SURVEY AND LAND USE PLANNING	2	0
SOIL 514	INTRODUCTION TO NANOTECHNOLOGY	2	1
SOIL 515	MANURES AND FERTILIZERS	2	1
SOIL 601	RECENT TRENDS IN SOIL PHYSICS	2	0
SOIL 602	MODERN CONCEPT IN SOIL FERTILITY	2	0
SOIL 603*	PHYSICAL CHEMISTRY OF SOIL	2	0
SOIL 604*	SOIL GENESIS AND MICRO MORPHOLOGY	2	0
SOIL 608	CLAY MINERALOGY	2	1
SOIL 591	MASTER'S SEMINAR	1	0
SOIL 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
SOIL 599	MASTER'S RESEARCH	30	
SOIL 699	DOCTORAL RESEARCH	75	

*** Core course**

25. VEGETABLE SCIENCE

COURSE CODE	COURSE TITLE	CREDITS-L	CREDITS-P
I-SEMESTER			
VSC 501*	PRODUCTION OF COOL SEASON VEGETABLE CROPS	2	1
VSC 504*	PRINCIPLES OF VEGETABLE BREEDING	2	1
VSC 505	BREEDING OF SELF POLLINATED VEGETABLE CROPS	2	1
VSC 509	PRODUCTION OF UNDERUTILIZED VEGETABLE CROPS	2	1
VSC 510	SYSTEMATICS OF VEGETABLE CROPS	1	1
VSC 514	POST HARVEST MANAGEMENT OF VEGETABLE CROPS	2	1
VSC-515/FL 515 /FHT 515	BASIC HORTICULTURE	2	1
VSC 601*	RECENT TRENDS IN VEGETABLE PRODUCTION	3	0
VSC 602*	ADVANCES IN BREEDING OF VEGETABLE CROPS	3	0
VSC 603	ABIOTIC STRESS MANAGEMENT IN VEGETABLE CROPS	2	1
VSC606	BIODIVERSITY AND CONSERVATION OF VEGETABLE CROPS	2	1
VSC605	BREEDING FOR SPECIAL TRAITS IN VEGETABLE CROPS	2	1
VSC 607	BIOTECHNOLOGICAL APPROACHES IN VEGETABLE CROPS	2	1
VSC 608	ADVANCED LABORATORY TECHNIQUES OF VEGETABLE CROPS	1	2
VSC604	SEED CERTIFICATION, PROCESSING AND STORAGE OF VEGETABLE CROPS	2	1
VSC 591	MASTER'S SEMINAR	1	0
VSC 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
VSC 502*	PRODUCTION OF WARM SEASON VEGETABLE CROPS	2	1
VSC 503*	GROWTH AND DEVELOPMENT OF VEGETABLE CROPS	2	1
VSC 506	BREEDING OF CROSS POLLINATED VEGETABLE CROPS	2	1
VSC 507	PROTECTED CULTIVATION OF VEGETABLE CROPS	1	1
VSC 508	SEED PRODUCTION OF VEGETABLE CROPS	2	1
VSC 511	ORGANIC VEGETABLE PRODUCTION	1	1
VSC-512	PRODUCTION OF SPICE CROPS	2	1
VSC 513	PROCESSING OF VEGETABLE	1	1
VSC 605	BREEDING FOR SPECIAL TRAITS IN VEGETABLE CROPS	2	0
VSC 607	BIOTECHNOLOGICAL APPROACHES IN VEGETABLE CROPS	2	1
VSC 608	ADVANCED LABORATORY TECHNIQUES OF VEGETABLE CROPS	1	2
VSC 604	SEED CERTIFICATION, PROCESSING AND STORAGE OF VEGETABLE CROPS	2	1

VSC 591	MASTER'S SEMINAR	1	0
VSC 691/692	DOCTORAL SEMINAR I/II	1	0
Research Work			
VSC 599	MASTER'S RESEARCH	30	
VSC 699	DOCTORAL RESEARCH	75	

***Core course**

26. WATER SCIENCE AND TECHNOLOGY

COURSE CODE	COURSE TITLE	CREDITS-L	CREDITS- P
I-SEMESTER			
WST 500*	WATER RESOURCE MANAGEMENT	3	0
WST 501*	FUNDAMENTALS OF FLUID MECHANICS AND HYDRAULICS	3	1
WST 502	SOIL-WATER-PLANT- ENVIRONMENT SYSTEM	3	1
WST 504	SOIL AND WATER CONSERVATION ENGINEERING	2	1
WST 601*	PRESSURIZED AND SURFACE IRRIGATION SYSTEM DESIGN	3	1
WST 602	ENVIRONMENTAL IMPACT ASSESSMENT OF IRRIGATION PROJECTS	3	0
WST 591	MASTER'S SEMINAR	1	0
WST 691/692	DOCTORAL SEMINAR I/II	1	0
II-SEMESTER			
WST 503*	CROP WATER REQUIREMENT AND IRRIGATION PLANNING	3	1
WST 505*	SOIL AND WATER QUALITY AND IRRIGATION MANAGEMENT	3	1
WST 506	AGRO-METEOROLOGY AND CLIMATE CHANGE	2	0
WST 507	WATERSHED MANAGEMENT AND MODELLING	2	1
WST 600*	ADVANCES IN WATER RESOURCE MANAGEMENT	2	1
WST 603	WATER MANAGEMENT TECHNOLOGIES FOR RAINFED AGRICULTURE	2	1
WST 604	SOCIO-ECONOMIC ANALYSIS OF WATER USE IN AGRICULTURE	3	0
WST 591	MASTER'S SEMINAR	1	0
WST 691/692	DOCTORAL SEMINAR I/II	1	0
Research work			
WST 599	MASTER'S RESEARCH	30	
WST 699	DOCTORAL RESEARCH	75	

***Core course**

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THE BLUE BOOK

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