

COMMON TO ALL PH.D. DEGREE PROGRAMMES (BY COURSE WORK)

(FULL-TIME / PART-TIME / EXTERNAL PROGRAMME)

(2010-2011)

DEPARTMENT OF AGRICULTURAL ECONOMICS

REGULATIONS AND SYLLABUS

REGULATIONS

1. SYSTEM OF EDUCATION

- 1.1 These rules and regulations shall govern the Ph. D Programmes leading to the award of Degree of Doctor of Philosophy in the concerned subject in the Faculty of Agriculture, Annamalai University. They shall come into force with effect from the academic year 2010-2011.
- 1.2 The semester system shall be followed for all the Ph. D degree programmes.
- 1.3 The duration of doctoral programmes is three (6 semesters) academic years. The first year of study shall be the first and second semesters following student's admission. The second year of study shall be the third and fourth semesters and third year means the fifth and sixth semesters. Every enrolled student will be required to undergo a specified load of course work in the chosen subject of specialization (Major, Minor and supporting courses) and complete seminars, research credits and submit thesis.

2. DEFINITIONS

- 2.1 An "Academic year" shall consists of two semesters.
- 2.2 "Semester" means an academic term consisting of 105 instructional days excluding final theory examinations.
- 2.3 "Course" means a unit of instruction to be covered in a semester having specific No., title and credits.
- 2.4 "Credit hour" means, one hour lecture plus two hours of library or home work or two and half hours of library/field practicals per week in a semester.
- 2.5 'Credit load' of a student during a semester is the total number of credits registered by that student during that particular semester.
- 2.6 'Grade Point' of a course means the value obtained by dividing the percentage of marks earned in a course by 10 and the Grade Point is expressed on a 10 point scale and rounded off to two decimal places.
- 2.7 'Credit Point' means the grade point multiplied by corresponding credit hours.
- 2.8 'Grade Point Average'(GPA) means the quotient of the total credit points obtained by a student in various courses at the end of each semester, divided by the total credit hours taken by the student in that semester. The grading is done on a 10 scale and the GPA has to be corrected to two decimals.
- 2.9 'Overall Grade Point Average' (OGPA) means the quotient of cumulative credit points obtained by a student in all the Courses taken from the beginning of the first semester of the year divided by the total credit hours of all the subjects which he / she had completed up to the end of a specified semester and determines the overall performance of a student in all subjects during the period covering more than one semester. The OGPA has to be arrived at the second decimal place.

3. PROGRAMMES OFFERED

The details of various Ph.D programmes offered in the Faculty of Agriculture are as follows:

Agri. Business Management
Agri. Economics
Agri. Entomology
Agri. Extension
Agri. Microbiology
Agronomy
Genetics and Plant Breeding
Horticulture
Plant Pathology
Seed Science & Technology
Soil Science and Agri. Chemistry

4. ELIGIBILITY FOR ADMISSION

Candidates seeking admission to Ph.D. programme should satisfy the following requirements.

- 4.1 Candidates with two year master degree programmes from Universities recognized by Annamalai University are eligible to apply for Ph.D programmes of the university.
- 4.2 Candidates who have undergone the programme under conventional system should possess not less than a second class Master degree. The candidates under trimester system should possess a minimum OGPA of 3.00 out of 4.00. For those under semester system 7.00 out of 10.00 is required for various Doctoral programmes. However, this will not apply to SC/ ST candidates, nominees of State Government / Annamalai university / ICAR / and Government of India for whom a pass in the concerned degree is sufficient.

Table – 1: Eligibility Criteria

Doctoral Degree Programmes	Eligibility
1. Agri Business Management	MBA in Agribusiness
2. Agri. Economics	M.Sc.(Ag.) in Agri. Economics/ Agri. Marketing Management.
3. Agri. Entomology	M.Sc.(Ag.) in Entomology
4. Agri. Extension	M.Sc.(Ag.) in Agri. Extension
5. Agri. Microbiology	M.Sc.(Ag.) in Agri. Microbiology
6. Agronomy	M.Sc.(Ag.) in Agronomy
7. Genetics and Plant Breeding	M.Sc.(Ag.) in Genetics and Plant Breeding
8. Horticulture	M.Sc (Ag.) Hort. / M.Sc. (Hort.)
9. Plant Pathology	M.Sc.(Ag.) in Plant Pathology
10. Seed Science & Technology	M.Sc.(Ag.) in Seed Science & Technology
11. Soil Science and Agri. Chemistry	M.Sc.(Ag.) in Soil Science and Agri. Chemistry

5. SELECTION PROCEDURE

A candidate who wishes to undertake Ph.D. programme of this University either full time or part time or external registration should apply in the prescribed form on or before the due date.

Applications which fulfils the above conditions (mentioned in the Prospectus) will be scrutinized by a Doctoral Committee consisting of the proposed guide, the Head of the Department and two or three senior staff members (not more than five). The candidate will have to appear for a written test and an interview (75 marks + 25 marks). The marks and the evaluation report will be placed before the Vice-Chancellor who in consultation with the Dean of the Faculty and Head of the Department will select and admit the applicant to work under the guide proposed.

5.1. PART TIME PROGRAMME

The part time programme will be offered to the in-service candidates / Research Scholars of projects of Annamalai University. The candidates of this University should route their application through HOD and Dean, Faculty of Agriculture. The duration of the programme will be of 3 years. The in-service candidates / Research Scholars of projects of Annamalai University will be permitted to register the Ph.D. programme by course work and they have to undergo one year course work by utilizing any eligible leave for that period.

5.2. EXTERNAL REGISTRATION

Eligibility : Same as for regular candidates. In addition to that, the following are the additional conditions for registration for a Ph.D. programme.

1. The candidates must register under a guide who is a member of the Faculty of this University
2. The candidate should be working as Lecturer/Reader/Professor or on equivalent positions on permanent basis in a recognized college where facilities for carrying out research work are available and have post graduate departments for Agrl. subjects or working as research assistants in private or government institutions having research and development facilities and who fulfill the eligibility conditions.
3. However such colleges/ research institutes should be recognized by Annamalai University for this purpose. The colleges/ research institutes/ organization should apply for recognition to the University in the prescribed format with recognition fee as specified by the University in the relevant subjects or department from which they wish to depute candidates for the Ph.D. programme. At the discretion of the Vice chancellor, a committee may be appointed to visit the college/Institution to inspect the infrastructure facilities available for pursuing Ph.D. research. Based on the recommendations of the committee, the university may permit a candidate from the department to be sponsored by the institution. This clause is not applicable to those institutions/ organizations that have been recognized already for external registration.
4. The candidate should have a recognized co-guide in parent department of the organization. The co-guides may be from other colleges / organization located from the same place if such persons are not available in the parental organizations.
5. Other regulations relating to Ph.D research in the University shall be applicable to these candidates also, except the clause relating to the period of residence.

6. The candidate shall undergo the course and research of the required credits during I year of the programme. He / She shall carryout the research at his / her parental organization for the rest of period of the programme.
7.
 - i. NOC (No Objection Certificate) is to be produced from the employer of the institution / Organization where he / she is working and attached along with the application.
 - ii. Co-guide acceptance letter should be also be enclosed with the application form.

6. CREDIT GRADE POINT REQUIREMENTS

6.1. A student enrolled for Doctoral program to become eligible for the degree is required to complete 75 credits inclusive of 48 credits of research as detailed below

Details	Credit Hours
I. Major Courses	14
II. Minor Courses	6
III. Supporting Courses	5
IV. Seminar	2
V. Research	<u>48</u>
Total	<u>75</u>

- 6.2. In a semester, a full time Ph.D. student can register a maximum of 15 credits. However, the research credits registered should not exceed 12 per semester. The Ph.D. students (FT / PT / EX) should complete their course work within two semesters in the first year.
- 6.3. Requirements for Ph.D. programme shall also include successful completion of thesis research in the major field of study and submission of thesis thereon.

7. ATTENDANCE REQUIREMENT

- 7.1. "One hundred percent attendance is expected from each scholar. A student who fails to secure 80 per cent of attendance in each subject separately for theory and practical, shall not be permitted to appear for the final examination in that subject and shall be awarded 'E' (incomplete) and will be required to repeat the subject when ever offered.
- 7.2. In respect of the student who has absented himself / herself for classes with or without valid reasons, that period will be treated as absence only and not as leave. Also, no attendance will be given for writing make up tests.
- 7.3 In case of new admission, for calculating 80% attendance in the first semester, the number of working days will be calculated from the date of joining of the students who are permitted to join late due to administrative reasons. However, for genuine reasons, condonation of attendance deficiency may be considered by the vice chancellor on the recommendation of the Advisory committee, HOD and Dean, Faculty of Agriculture on payment of condonation fee prescribed by the university.
- 7.4 Students absenting from the classes with prior permission of the HOD on official University business shall be given due consideration in computing attendance.
- 7.5. In respect of students who had absented for the mid-semester examination on University business with prior permission of the HOD and Dean, Faculty of

Agriculture the make up mid-semester examination should be conducted ordinarily within 15 working days from the date of conduct of the mid-semester examination.

- 7.6. The students who absent himself/herself for mid-semester examination in a subject on genuine reasons shall be permitted on the recommendation of the course teacher / Chairman and Head of the department concerned. Missing examination should be completed within 15 working days from the date of respective examination on payment of missing examination fee prescribed by the university.

8. ADVISORY COMMITTEE

- 8.1. Each Ph.D. scholar shall have an advisory committee to guide the student in carrying out his/her programme. A teacher having Ph.D with 5 years service and PG teaching is eligible for teaching and guiding Ph.D programme.

8.2. Major Adviser (Chairman)

Every student shall have a major adviser (among the recognized guides), who will be appointed as chairman by the Vice-Chancellor on the recommendation of the Head of the Department and the Dean, Faculty of Agriculture. The approved chairman only can be the guide for the students. For external candidate, a Co-Guide from his/her parental organization will be the Co-Chairman of the Advisory Committee. A teacher should have a minimum of three years of service before retirement for allotment of doctoral candidates. The chairman in consultation with the HOD will nominate the other three members. In the event of the major adviser being away on other duty/leave for a period upto one year, the member of the advisory committee from the same department will officiate as the major advisor.

8.3. Members

The advisory committee for Ph.D. scholar shall comprise of a chairman and three members. One member will be from the respective department and two members will be from other related departments. In thesis topics involving more of interdisciplinary approach, the number of advisory committee members from other disciplines may be increased by one with prior approval of the Dean. A Proposal for the formation of the advisory committee of the students shall be forwarded by the Heads of the Department to the Registrar for approval within one month from the commencement of the Ist semester. External experts may be included as member in the advisory committee based on the need and expertise of the member, without any financial commitment to the university so as to improve the quality of the thesis. The external expert member proposed should meet the minimum qualification required and the proposal is to be approved by the Registrar.

8.4. Changes in advisory committee

The proposals for changes in the advisory committee is to be sent to the controller of examinations, through HOD and Dean for approval, if it is keenly felt that such changes are absolutely necessary.

8.5. Change of Guide and Topic

If a change of guide becomes necessary, the reason for such change should be indicated, which will be examined by a committee comprising of Head of the

Department, one senior faculty of the Department and Dean, to be approved by the Vice Chancellor. The research scholars will be permitted to continue to work and submit their thesis under the guidance of a retired person only up to a maximum period of six months from the date of retirement of the guide. On such occasions, the Head of the Department concerned will ascertain the progress of the scholar in consultation with the guide and find whether the scholar will be able to submit his / her thesis within six month from the date of retirement of his / her guide. If not, the Head of the Department will suggest the change of guide for the scholar in consultation with the guide (about-to- retire) through the concerned Dean. If a guide goes abroad/ within India to attend any training or on leave for more than one year, the Chairman of the Advisory Committee has to be changed immediately. The same conditions will apply to members also.

8.6. Absence of member during qualifying / final Viva-Voce examination

Under extra-ordinary circumstances if the qualifying/ final viva-voce examination to Ph.D. student has to be conducted in the absence of one or two advisory committee members, permission to conduct the examination by co-opting another member in such contingencies should be obtained from the Controller of Examinations in advance. Duties and responsibilities of the advisory committee

- Guiding students in drawing the academic plan of Ph.D programme
- Guidance throughout the programme of study of the student
- Guiding the student in selecting a topic for thesis research, and seminar
- Continuous monitoring of thesis research, and seminar and maintaining monitoring register for each student for research
- Evaluation of research and seminar credits
- Correction and finalization of thesis draft
- The members should meet together along with the student for all the above purposes and sign the appropriate documents.
- The proceedings of the Advisory committee will be sent to the HOD within 10 working days
- Periodical review of the Advisory committee proceedings will be made by the HOD

9. PROGRAMME OF STUDY

9.1. The student's plan for Ph.D work drawn up by advisory committee shall be sent to the HOD before the commencement of the mid semester examination during the first semester.

9.2. The programme shall be planned by the Advisory committee taking into account his/her previous academic training and interest.

9.3. Programme of Research Work

The proposal for research program of the student, in the prescribed proforma and approved by the advisory committee, shall be forwarded to the HOD by the end of the first semester in which the research credits are registered for the first time or before taking up of the research work whichever is earlier.

10. EVALUATION OF STUDENT'S PERFORMANCE

All students shall abide by the rules for evaluating the course work under the semester system of education, as prescribed from time to time by the university.

10.1. Examinations

There will be two examinations viz. mid semester and final examination. Wherever the course has practical, there will be a final practical examination also.

10.2. Grading

- The duration of mid semester examination will be of one hour and final examinations in theory and practical will be conducted for three hours each.
- The mid semester examinations will be conducted by course teachers during the ninth week of the semester in common examination hall as per the scheme drawn by HOD, evaluate and send the marks obtained by the students to the Controller of Examinations through HOD within seven working days.
- There will be final theory examination separately for theory and practical which will be conducted by the University. Each final theory and practical examinations will be evaluated by two examiners (one will be the course teacher and another will be the senior faculty of the Department).
- The distribution of marks will be as indicated below:

S.No	Examination	Course with practical	Course without practical	Course without theory
1	Mid-semester	30	30	30
2	Final theory	40	70	-
3	Final practical	30	-	70
	Total	100	100	100

The question paper model and distribution of marks for mid semester and final theory examinations are as follows.

Mid semester:

1	Objective Type	10 out of 12	(10 x 0.5)	5 marks
2	Definitions/concepts	5 out of 7	(5 x 1)	5 marks
3.	Short notes	5 out of 7	(5 x 2)	10 marks
4	Essay type	2 out of 3	(2x5)	10 marks

Final Theory:

Courses without practical (70 marks)

1.	Short notes	5 out of 7	(5 x 4)	20 marks
2	Essay type	5 out of 7	(5 x 10)	50 marks

Courses with practical (40 marks)

1.	Short notes	5 out of 7	(5 x2)	10 marks
2	Essay type	5 out of 7	(5 x 6)	30 marks

10.3. MINIMUM MARKS FOR PASS

- The student should secure a minimum of 60 per cent marks separately in the theory and practical and an aggregate of 70% to secure a pass in the subject .
- Each subject shall carry a maximum of 100 marks for purpose of grading. The grading will be done as grade point. i.e., the percentage of marks earned in a subject is divided by 10. The grade point is expressed on a 10 point scale upto two decimals.

- c) Students who secure marks below 70 per cent in a subject will be awarded 'F' grade and students without having the required minimum attendance of 80 per cent will not be allowed to write the final examination and they will be awarded 'E' grade. Students who secure 'F' should appear for re-examination in the subsequent semester.
- d) If a student secured 'E' grade, he/she has to re-register and attend the course again during the next academic year.

10.4. MINIMUM GPA REQUIREMENT

A Ph.D student to continue his/her studies in the University, should maintain certain minimum Average Grade Point prescribed here under:

- a) Earn a Grade Point of 7.00 for a pass in each subject.
- b) For purpose of continuing as a student in the university, a candidate is required to earn an Overall Grade Point Average of not less than 7.50 at the end of each semester
- c) A Ph.D. student may repeat the course(s) in which he/she gets a Grade point below 7.50 and above 7.0 to improve the OGPA.

10.5. RE-EXAMINATION

Re-examination is permitted only for the final theory and practical examinations. The students who secure 'F' are permitted to write the re-examinations along with juniors as and when conducted with the permission of university. The re-examination fee as prescribed by university per course is to be paid on or before the prescribed date. A student is permitted to write the final theory and practical examinations only two times during the course period of three years excluding the regular final examination. In event of a student fails to secure pass in the two re-examinations permitted, he/she has to re-register for the course along with juniors. The marks secured in mid semester examination will be retained and the student should produce the practical record during re-examination. The registration for the re-examination shall be done after mid-semester examination on the date specified by the Controller of Examinations. Each registration is considered as an attempt even if the student absents for the examination.

10.6. RETURN OF VALUED ANSWER PAPERS

The valued answer papers of mid-semester shall be shown to the students after the examination. Discrepancies if any, in awarding marks, the student can approach the teacher concerned immediately for rectification. The answer paper should be retained with the course teacher for six months and then disposed off. Evaluated final theory papers have to be retained up to six months by the Controller of Examinations after the conduct of examination and then disposed off. The same is applicable to improvement/re-examination also.

11. CREDIT SEMINAR

Seminar is compulsory for all students and each student should register and present two seminars each with 0+1 credits. A student can register only one seminar in a semester and only after successful completion of the first seminar the student is permitted to register second seminar.

11.1. Credit Seminar

- a) The seminar topic should be only from the major field and should not be related to the area of thesis research.
 - b) The seminar topics are to be assigned to the students by the Chairman in consultation with HOD within three weeks after commencement of the semester.
- 11.2. Under the guidance and supervision of the chairman of the Advisory committee, the student should prepare a seminar paper containing not less than 50 typed and printed pages with a minimum number of 75 references covering the recent 10 years time after reviewing all the available literature and present the seminar after completion of 80% attendance in the semester in the presence of the HOD, Advisory committee, staff and post-graduate students of the concerned department.
- 11.3. The circular on the presentation of the seminars may be sent to other departments to enable those interested to attend the same.
- 11.4. The Chairman will monitor the progress of the preparation of the seminar course and correct the manuscript. The student will submit 2 copies of the corrected manuscript to the HOD through chairman before presentation. The student will incorporate the suggestions and carry out corrections made during the presentation and resubmit three fair copies to the HOD (one to Dept. library, the second to the chairman and the third for student) within 15 days after presentation.
- 11.5. The performance of the student in the credit seminar will be evaluated and grade point awarded by the HOD along with the Advisory committee for 100 marks. Grade Point may be given based on the following norms:

Coverage of literature	:	40
Presentation	:	30
Use of audio visual aids	:	10
Capacity to participate to discussion and answer the questions:		<u>20</u>
Total :		<u>100</u>

12. QUALIFYING EXAMINATION

Only those students who successfully completed the qualifying examination will be admitted to candidacy of the degree. The qualifying examination consists of written and oral examination.

12.1. Minimum requirement for Qualifying Examination

The students who have completed all the courses and earned a grade point average of not less than 7.5 will be permitted to appear for the qualifying examination. Students who do not satisfy these requirements shall not be permitted to take up the qualifying examination. The qualifying examination will be conducted after the completion of course work.

12.2. Selection of Examiner

A panel of five external examiners for qualifying examinations shall be given by the Advisory committee in consultation with HOD before three months of the date

of completion of the student's course work to the Controller of Examinations. One to them will be appointed as external examiner.

12.3. Written Examination

The written examination consists of two papers covering major and minor subjects only. The Controller of Examination will conduct the examination by getting the question paper from Head of Department to be prepared in consultation with the course teachers concerned. The external examiner will evaluate the answer papers during his visit to conduct the viva-voce examination.

The question paper for the written examination will be of 3 hours duration and each question (Essay type) need not be restricted to any particular topic in a course but it should be a comprehensive covering of each unit of the syllabus of each course. The written examinations will be conducted at the same time in all disciplines.

Qualifying marks for passing the examination will be 60.

12.4. Qualifying viva-voce Examination

The advisory committee shall conduct the qualifying viva-voce examination with one external member who shall be a specialist in the subject from outside the university

12.5. The Heads of departments will monitor and coordinate the conduct of the qualifying viva. The performance of the candidate will be Graded as Satisfactory / Unsatisfactory.

12.6. Communication of Results of Qualifying Examination

The chairman of the advisory committee shall act as chairman for the examination committee and shall be responsible for communicating the results of the examination to the Controller of Examination through HOD in the prescribed format.

12.7. Failure /Absence in Qualifying Examination

When a student fails or absents for the qualifying examination, he/she may apply again for permission to appear for re-examination to the Controller of Examination with the recommendation of the chairman of the advisory committee and Head of the Department. A student, who apply for re-examination should attend written examination and viva-voce. Re-examination shall not take place earlier than three months after the first examination and it will be conducted by the advisory committee as previously indicated. If a student fails in the re-examination further re-examination will be considered on the recommendation of the Advisory Committee, HOD and Dean, Faculty of Agriculture.

If the students fail in the qualifying examination, he / she is not permitted to register for further research credits.

13. THESIS RESEARCH

13.1. Selection of Topic

Once the student joined the programme, it is the responsibility of the Head of the department to organize a meeting of the students and PG teachers to make the students know about various activities of the department. The students should be informed about the thrust areas of research of the department, research projects undertaken by the scientists in the department, research problems taken by the

senior PG students, field of specialization of each scientist and infra-structural facilities available in the department so that the student will develop some preliminary knowledge about the research problems. With the guidance of the advisory committee the students should identify the tentative area of research and include it in the plan of work. The advisory committee should guide the students in selecting a specific topic in the identified area and preparing a detailed proposal. While selecting the topic for thesis research, the specialization and competency of teachers, thrust area identified by the department, external funded schemes operated in the department and also the aptitude of the student may be taken into consideration. The thesis research for the Ph.D. degree should be of the nature of a definite contribution to the subject and the results should be of sufficient importance to merit publication. The findings should have some practical utility or should lead to theoretical contribution. The thesis shall be on a topic falling within the field of the major specialization and shall be the result of the student's own work. A certificate to this effect duly endorsed by the major advisor shall accompany the thesis.

13.2. Research Proposal

The research proposal has to be presented by the student in a meeting organized by the Head of the department to get the opinion / suggestion of the scientists of the department for improving it. Three copies of the research proposal in the prescribed format should be sent to the Registrar through the Head of the department for approval before the end of the semester in which the student has registered research credits for the first time or before taking up the field / laboratory experiments whichever is earlier.

The distribution of research credit will be as follows

I Semester	0+01
II Semester	0+02
III Semester	0+12
IV Semester	0+12
V Semester	0+12
VI Semester	<u>0+09</u>
Total	<u>0+48</u>

13.3. Evaluation of Thesis Research

After assigning the research problem, for each semester the student has to submit a detailed programme of work to be carried out by him/her during the semester in the prescribed proforma. After scrutiny and approval, a copy of the programme has to be given to the student for carrying out the work during the semester.

13.3.1. Attendance register must be maintained in the department by HOD for all the students to monitor whether the student has 80% of attendance in research.

13.3.2. The student has to submit his/her research observation note book to the major Adviser. The major Adviser will scrutinize the progress and sign the note book with remarks as frequently as possible. This note book will form the basis for evaluation of research progress.

13.3.3. After completion of 80% attendance for research and on or before the last day of the semester, the advisory committee should evaluate the progress of research work as per the approved programme and monitoring register and award marks to secure a pass depending upon quantity and quality of work done by the student during the semester.

13.3.4. The procedure of evaluating research credits under different situations are explained hereunder.

SITUATION – I

The student has completed the research credits as per the approved programme and awarded 'Marks' by the advisory committee. Under the said situation the student can be permitted to register fresh research credits in the subsequent semester. If the student is not successful, he/she has to re-register the same block of research credits.

SITUATION – II

The student who has not secured the minimum attendance of 80 percent (i.e. absent for more than 21 working days) shall be awarded grade E. The student has to re-register the same block of research credits for which 'E' grade was awarded in the following semester with prior permission. Until the completion of reregistered credits, the student should not be allowed to register for fresh (first time) research credits.

SITUATION – III

The student could not complete the research as per the approved programme of work for reasons beyond his/her control such as,

- a) Failure of crop
- b) Non-incidence of pests or disease or lack of such necessary experimental conditions.
- c) Non-availability of treatment materials like planting materials chemicals, etc.
- d) Any other impeding / unfavourable situation for satisfying the advisory committee.

Under the said situations Grade 'EE' should be awarded.

In the mark list, it should be mentioned that 'EE' grade was awarded due to 'lack of attendance' or 'want for favourable experimental conditions'.

SITUATION – IV

When the student failed to complete the work even in the 'Second time' registration the student will be awarded EE and in the mark list the 'second time' should be mentioned

For the registration of research credits for the third time, permission has to be obtained from the Dean based on the recommendation of the Advisory committee, and HOD. Permission for registration for the fourth time shall be given only by University based on the recommendation of the Advisory committee, HOD and Dean, Faculty of Agriculture.

14. SUBMISSION OF THESIS

The research credits registered in the last semester should be evaluated only at the time of the submission of thesis, by the advisory committee. Students can submit the thesis at the end of the final semester. The list of enclosures to be submitted along with the thesis is furnished. If a student has completed the thesis before the closure of the final

semester, the chairman can convene the advisory committee meeting and take decision on the submission of the thesis provided the student satisfies 80 per cent attendance requirement.

A minimum of one paper relevant to the topic of the thesis in each of National and International journals be published before submission of the Ph.D thesis and the copies of the same be enclosed in the thesis by all research scholars. After completing the minimum requirement period of research, the candidate will submit five copies of his / her thesis printed or typewritten, in paper back embodying the result of the research carried out by him / her, together with the submission fee as specified by the University. Three months before the submission of thesis, he / she has to submit three copies of the synopsis of the Controller of Examinations with the prescribed fee.

In case the candidate fails to submit the thesis (after submission of the synopsis) within the stipulated time, he / she has to resubmit the synopsis with a condonation fee as specified. Every candidate should also submit with the thesis a certificate from the guide / co-guide and the advisory committee members under whom the candidate worked, specifying that the thesis submitted is a record of research work done by the candidate during the period of study under him / her, and that the thesis has not previously formed the basis for the award of any Degree, Diploma, Associate ship, fellowship or similar title. A statement from the guide indicating the extent to which the thesis represents independent work on the part of the candidate should also be made. A candidate shall also attach to his / her thesis, in support of the quality of his / her research work, printed copies of any contributions he / she might have published in journals / periodicals along with names of such journals and periodicals.

After incorporating the suggestions of the examiners and those received at the time of viva-voce, four hard bound copies of the thesis and two copies in CDs should be submitted to the university. However, fellowship holder has to submit additional hard bound copy as per requirement.

15. VALUATION OF THE THESIS

The thesis submitted in partial fulfillment of the Ph.D. degree shall be evaluated by two external experts one from within the country and the other from outside the country appointed by the Vice-Chancellor on the recommendation of the Chairman of the Advisory committee, HOD and Dean. They shall be chosen from a panel of at least five names of specialists separately for within the country and outside the country in the particular field, suggested by the chairman. The external experts shall send their evaluation reports on the thesis directly to the Controller of examination along with the copy of the thesis evaluated. The controller of examinations on receipt of the reports from the two examiners will send them to the concerned guide who is the convener of viva-voce board. The guide will send the consolidated report with his remarks to the controller of examinations through the Head of the Department. On the satisfactory reports of the evaluation, viva-voce examination will be arranged.

After a student's thesis for Ph.D. degree is evaluated as indicated above, the thesis shall be finally accepted for the award only after the student satisfactorily completes a final viva-voce examination. The Viva-Voce board comprises the student's advisory committee with the addition of the external examiner who valued the thesis, and the HOD.

If the HOD happens to be the guide, the Dean Faculty of Agriculture will nominate a senior member of the staff of the concerned Department as a member. In case of external candidates, the co-guide will also serve as a member of the viva-voce board. The candidate is expected to defend the thesis at the viva-voce examination. The degree shall be awarded on the unanimous recommendation of the examining committee as satisfactory in regard to the thesis itself and the performance of the student in the final oral examination. The recommendation of the committee shall be forwarded to the controller of examinations by the chairman through HOD and Dean which shall be signed by all members of the committee and the external examiner.

15.2. Revision and Resubmission of Thesis

i. If an examiner recommended change / further work, the thesis will be referred to the same examiner after compliance for his opinion. In case of rejection by any one of the examiners, the thesis will be sent to another examiner and his / her recommendation will be final.

ii. If the thesis is recommended to be revised by one or both examiners the points of revision will be indicated clearly in the report. The necessary correction should be carried out, and the revised version should be sent to the concerned examiner(s). If the examiner(s) is / are still not satisfied with the revised version, the thesis will be rejected. If the thesis is accepted by the examiners (Evaluation), Viva-Voce examination will be conducted by the viva-voce board.

iii. A candidate who is not successful (unsatisfactory) at the viva-voce examination will be permitted to undergo the viva voce examination again within a period of three months.

15.3. Grace Period

Students can avail of a grace period of upto three months for submission of thesis after the closure of final semester by paying necessary fine. For grace period upto one month and for period upto three months a fine as specified has to be paid separately. If a student is not able to submit the thesis within three months of grace period, the student has to re-register for the credits in the forthcoming semester. The student who re-registers the credits after availing of the grace period will not be permitted to avail of grace period for the second time. The Heads of the Department can sanction the grace period based on the recommendation of advisory committee and a copy of the permission letter along with the receipt for payment of fine should accompany the thesis while submission.

15.4. Re-registration and Submission of Thesis

The minimum of 80% attendance requirement for submitting the thesis after re-registration need not be insisted for those students who have fulfilled the minimum academic and residential requirement of 3 years (6 semesters) and completed the credit requirements with 80% attendance.

15.5. Extension of Time

a. The minimum residential requirement for Ph.D degree shall be three academic years (six semesters) within a maximum period of five academic years (10 semesters) from the date of admission.

b. Scholars who do not submit the thesis within the stipulated period of five years should apply for extension of time three months before the completion of five years.

Extension of time and the fees to be paid will be considered by the Deans Committee, if the extension is duly recommended by the Advisory committee, Head of the department, and the Dean of the Faculty, such candidates will be eligible for extension of time for a maximum period of three years.

c. The scholar will have to enroll as fresh candidates if he/she fails to submit the thesis within the maximum extension period of three years when granted.

d. If a scholar requires a few more months after the expiry of the maximum extension period of three years for the submission of the thesis as per the evaluation of the Advisory committee, duly recommended by the Head of the Department and the Dean of the Faculty, as an exceptional case the Deans committee may consider for re-registration to enable the scholar to submit the thesis. In any case the time granted shall not exceed six/ twelve months.

15.6. Number of Chances

A candidate will not be permitted to submit a thesis for the degree on more than two occasions. However, it will be open to the syndicate, if the Board of Examiners so recommend, to permit the candidate to submit a thesis on a third occasion. Also, he will not be permitted to appear for the viva-voce examination on more than two occasions.

16. DISCONTINUANCE AND READMISSION

16.1. Students admitted to any of the PhD degree, discontinue their studies before completing the degree with written permission from the University may be re-admitted to the degree programme, provided that the student should have completed the course work before such discontinuance. However the period of such discontinuance should not exceed five years for Ph.D. Degree.

16.2. After completion of course work and qualifying examination a student is eligible to discontinue temporarily his research program only once within 5 years for PhD program. If the discontinuation period exceeds two semesters the student has to forego the research credits already registered and register afresh with revised program. In the case of field experiments or laboratory experiments in which continuity is essential for research and if a student temporarily discontinues in the middle without completing the experiments, then the entire experiment should be repeated even if the discontinuation period does not exceed two semesters.

16.3. A student joining the studies, after discontinuation should pay the fees of the existing semester.

17. PUBLICATION OF THE THESIS

The thesis, whether approved or not, should not be published in full or abridged form without the permission of the Syndicate, which may grant permission for the publication under such conditions as it may impose.

18. The Heads of the Departments should monitor the progress of the students. He has to arrange for a common meeting of the chairman and students of his department once in a semester. Each department should maintain a list of theses produced so far with the abstract of the same.

DEPARTMENT OF AGRICULTURAL ECONOMICS
Ph.D. AGRI BUSINESS MANAGEMENT (BY COURSE WORK)
(FULL TIME / PART TIME / EXTERNAL) (2010-2011)

Distribution of Courses

Course No.	Course Title	Credit Hours
Major Courses		
ABM 811	Advances in Marketing Management	2+1
ABM 812	Advances in Operations Research and Analytical Techniques	2+1
ABM 813	Advances in Business Economics	1+1
ABM 821	Financial Management and Project Analysis	2+1
ABM 822	Human Resource Management and Organizational Behaviour	2+1
	Sub Total	9+5
Minor Courses		
ABM 814	Agri Business Sector Analysis	2+1
ABM 823	Supply Chain and Logistics Management in Agri Business	2+1
	Sub Total	3+2
Supportive Courses		
COM 811	Advances in Computer Applications	1+1
STA 821	Advanced Statistical Methods for Social Sciences	2+1
	Sub Total	3+2
ABM 012	Seminar	0+1
ABM 022	Seminar	0+1
	Sub Total	0+2
ABM 011	Research	0+1
ABM 021	Research	0+2
ABM 031	Research	0+12
ABM 041	Research	0+12
ABM 051	Research	0+12
ABM 061	Research	0+9
	Sub Total	0+48
	Grand Total	16+59=75

Semester Wise Distribution

Semester – I		
Major		Credit Hours
ABM 811	Advances in Marketing Management	2+1
ABM 812	Advances in Operations Research and Analytical Techniques	2+1
ABM 813	Advances in Business Economics	1+1
Minor		
ABM 814	Agri Business Sector Analysis	2+1
COM 811	Advances in Computer Applications	1+1
ABM 012	Seminar	0+1
ABM 011	Research	0+1
	Sub Total	8+7
Semester – II		
Major		
ABM 821	Financial Management and Project Analysis	2+1
ABM 822	Human Resource Management and Organizational Behaviour	2+1
Minor		
ABM 823	Supply Chain and Logistics Management in Agri Business	2+1
STA 821	Advanced Statistical Methods for Social Sciences	2+1
ABM 022	Seminar	0+1
ABM 021	Research	0+2
	Sub Total	8+7
Semester – III		
ABM 031	Research	0+12
Semester – IV		
ABM 041	Research	0+12
Semester – V		
ABM 051	Research	0+12
Semester – VI		
ABM 061	Research	0+9
	Grand Total	16+59=75

ABM 811 ADVANCES IN MARKETING MANAGEMENT (2+1)

Objective

- To make the scholars exposed to the recent trends and advances in marketing research and management

Theory

Unit-I: Emerging markets

Low income markets / bottom of the pyramid – nature of the BoP market – products and services for BoP – market analysis – consumer characteristics – marketing strategy – BoP global opportunities.

Unit-II: Brand management

Branding strategies – brand positioning and values – building brand equity – brand equity assessment – leveraging secondary brand knowledge – building global brand.

Unit-III: Marketing strategy

Developing marketing strategies and plans – strategic marketing planning process – marketing ethics – analyzing the marketing environment – socially responsible marketing.

Unit-IV: Marketing models

Multi-level marketing – business to business marketing – direct marketing – advances in electronic marketing – net working and e-marketing models.

Unit-V: International marketing management

Assessing global markets – strategies and ethical issues in global marketing – trade policies – instruments, impacts of trade policies – economic integration and regional grouping.

Practical

Emerging market analysis – marketing communication for BoP – pricing methods for BoP – brand equity assessment – brand extensions –communicating brand value – service market

potential – ethical issue in services – analyzing marketing costs-social marketing models – evaluating impact of social marketing – e-marketing models – issue in global marketing – evaluating impact of trade policies, economic integration and regional grouping.

Theory Lecture Schedule

1. Low income markets / bottom of the pyramid – nature of the BoP market
2. Products and services for BoP
3. BoP global opportunities
4. Research issues in BoP-I
5. Research issues in BoP-II
6. Marketing models for BoP-I
7. Marketing models for BoP-II
8. Market analysis – consumer characteristics
9. Marketing strategy forBoP– I
10. Marketing strategy forBoP– II
11. Branding strategies
12. Brand positioning and values
13. Building brand equity
14. Brand equity assessment
15. Leveraging secondary brand knowledge
16. Building global brand.
17. Mid semester examination
18. Developing marketing strategies and plans - I
19. Developing marketing strategies and plans - II
20. Strategic marketing planning process
21. Marketing ethics
22. Analyzing the marketing environment
23. Socially responsible marketing.
24. Multi-level marketing –business to business marketing
25. Direct marketing
26. Advances in electronic marketing

27. Net working
28. e-marketing models.
29. Assessing global markets – strategies and ethical issues in global marketing - I
30. Assessing global markets – strategies and ethical issues in global marketing - II
31. Trade policies – instruments, impacts of trade policies – I
32. Trade policies – instruments, impacts of trade policies – II
33. Economic integration and regional grouping – I
34. Economic integration and regional grouping - II

Practical Schedule

1. Emerging market analysis – I
2. Emerging market analysis – I
3. marketing communication for BoP
4. Pricing methods for BoP
5. Brand equity assessment
6. Brand extensions
7. Communicating brand value
8. Branding strategies
9. Designing marketing logistics
10. Analyzing marketing costs
11. Social marketing models
12. Social marketing strategies
13. Evaluating impact of social marketing
14. e-marketing models
15. Ethical issues in global marketing
16. Issue in global marketing
17. Evaluating impact of trade policies, economic integration and regional grouping.

References

1. Philip Kotler, Kevin lane Keller, Abraham Koshy and Mithileswar Jha, 2007, Marketing management – South Asian Perspectiv, Person Education in South Asia.
2. J. Michael Etzel, Bruce J. Wlaker, William J. Stanton and Ajay Pandit, 2007, Marketing – Concepts and Cases (New Delhi: The McGraw – Hill Company Ltd.)
3. Dhruv Grewal an Michael Levy, 2008, Marketing (New Delhi; Tata McGraw Hill Publishing Company Ltd.)
4. Jha. S. M., 2007, Service Marketing, Himalaya Publishing House, New Delhi.
5. Francis Cherunilam, 2006, International Trade and Export Management, Himalayas Publishing House, Mumbai.

**ABM 812: ADVANCES IN OPERATIONS RESEARCH AND
ANALYTICAL TECHNIQUES (2+1)**

Objective

- To make the scholars to get trained in the advanced operations research tools
- To explain techniques available in management science

Theory

Unit-I Operations Research and Linear Programming Models

Introduction to O.R. classification of O.R. models - OR in business and industry - scope of OR in modern management - OR and decision making - review of linear programming models - methods of solution - duality theory and sensitivity analysis - applications of LP in transportation, networking and assignment problems - extensions of LP model.

Unit-II: Queuing Models

Structure and components of a queuing process - examples of real queuing systems - queuing theory assumptions - disciplines and notations - single and multi channel queuing models - derivation of necessary formulae under steady state conditions only.

Unit-III: Game theory. Simulation and Experimental Economics

Formulation of Two-person Zero-sum game - solution of simple games - mixed strategy games - solving using graphical method and LP - reduction using dominated strategies - saddle point condition - simulation process - stochastic simulation - Monte Carlo sampling process - random process generation - types of simulation - selected simulation application - simulation of queuing system - experimental economics - applications - willingness to pay and estimation through BDM procedure.

Unit-IV Quantitative Analysis I

Multivariate analysis techniques - multiple regression analysis - linear probability models - data envelopment analysis.

Unit-V: Quantitative Analysis II

Factor analysis - principal component analysis - correspondence analysis - discriminate analysis - MANOVA - cluster analysis - multi dimensional scaling - conjoint analysis - canonical correlation.

Practical

Application of OR - Linear of Programming: formulation of LP models - graphical solution, simplex method - duality theory and application - waiting line models: Elements of queuing models - poisson arrival and exponential service time distributions - M/M/1 queue - finite population models - queuing cost models. Simulation: simulation modeling - use of random numbers flow chart development, examples. Multiple regression analysis - linear probability models data envelopment analysis - factor analysis - principal component analysis - correspondence analysis discriminate analysis - MANOVA cluster analysis - multi-dimensional scaling - conjoint analysis - canonical correlation.

Theory Lecture Schedule

1. Introduction to O. R
2. Classification of O. R models
3. Scope of OR in modern management
4. OR in business and industry
5. OR and decision making
6. Structure and components of a queuing process, examples of real queuing systems, queuing theory assumptions, disciplines and notations – I
7. Structure and components of a queuing process, examples of real queuing systems, queuing theory assumptions, disciplines and notations – II
8. Structure and components of a queuing process, examples of real queuing systems, queuing theory assumptions, disciplines and notations – III
9. Single and multi channel queuing models, derivation of necessary formulae under steady-state conditions.
10. Main features of dynamic programming problems, forward and backward recursion, selected DP applications, general discussion related to probabilistic extensions.
11. Formulation of Two-person Zero-sum game, solution of simple games.
12. Mixed strategy games, solving using graphical method, solving using LP, reduction using dominated strategies, saddle point condition - I
13. Mixed strategy games, solving using graphical method, solving using LP, reduction using dominated strategies, saddle point condition - II

14. Mixed strategy games, solving using graphical method, solving using LP, reduction using dominated strategies, saddle point condition – III
15. Simulation process, stochastic simulation.
16. Monte Carlo simulation process.
17. **Mid-semester examination.**
18. Random process generation, types of simulation
19. Selected simulation applications
20. Simulation of queuing system
21. Simulation of inventory system
22. Experimental economics - Applications in Consumer Buying Behaviour Research.
23. Experimental Economics - Willingness to pay and its estimation through BOM procedure.
24. Multiple Regression analysis, Linear Probability Models and their applications in business management -1
25. Multiple Regression analysis, Linear Probability Models and their applications in business management -1
26. Multivariate techniques used in business research- Factor Analysis, and its applications.
27. Multivariate techniques used in business research- Principal Component analysis and its applications.
28. Multivariate techniques used in business research- Correspondance analysis and its applications.
29. Multivariate techniques used in business research- Discriminant analysis and its applications.
30. Multivariate techniques used in business research- MANOVA and its applications.
31. Multivariate techniques used in business research- Cluster analysis and its applications.
32. Multivariate techniques used in business research- Multidimensional scaling and its applications.
33. Multivariate techniques used in business research- Multi- Conjoint analysis and its applications.
34. Multivariate techniques used in business research- Multi- Canonical correlation and its applications.

Practical Schedule

1. Review of Linear Programming models, Formulation of LP Models, Graphical solution.
2. Applications of LP in Transportation, Networking and Assignment problems.
3. Simplex method, Duality theory and Sensitivity analysis.
4. Waiting line models: Elements of queuing models, Poisson arrival and exponential service time distributions, M/M/I Queue, Finite population models.
5. Queuing cost models
6. Simulation: Simulation modeling, Use of random numbers, flow chart development, examples.
7. Estimation of multiple regression models.
8. Estimation of linear probability Models- Logit, Probit and Tobit.
9. Use of factor analysis and principal component analysis.
10. Perpetual mapping through correspondence analysis.
11. Discriminate analysis and MANOVA.
12. Cluster analysis
13. Decomposition approach- Multi-dimensional scaling.
14. Conjoint analysis
15. Canonical Correlation
16. Extension of LP technique- data envelopment analysis- I
17. Extension of LP technique- data envelopment analysis- II

References

1. Paul A. Jensen and Jonathan F. Bard. 2008. *Operations Research Models and Methods*. Wiley.
2. Hamdy A Taha. 2008. *Operations Research- An Introduction*, Dorling Kindersley (India) Pvt Ltd. New Delhi.
3. Frederick Hillier, Gerald Lieberman. 2005, *Introduction to Operations Research*, McGraw Hill.
4. Barry Render Ralph M. Stair Michael E. Hanna, 2008, *Quantitative Analysis for Management (Cd)*. Dorling Kindersley (India) Pvt Ltd., New Delhi.
5. Render, 2006, *Outlines & Highlights for Quantitative Analysis for Management*. Academic Internet Publishers.

ABM 813 – ADVANCES IN BUSINESS ECONOMICS (1+1)

Objective

- To impart the students the latest developments and advances in business economics

Theory

Unit-I: Theory of consumption

Recent developments in the theory of market demand – dynamic version – demand functions – Linear expenditure system (LES) – Almost ideal demand system model.

Unit-II: Theory of production

Production functions-returns to scale-law of variable proportion – technical progress and production functions – Theory of costs and business applications of cost analysis.

Unit-III: Theory of firm

Perfect and imperfect markets – equilibrium of firm and pricing under dynamic changes in demand and costs – criticism of neo-classical theory of the firm – Managerial and behavioral theories of firm.

Unit-IV: Strategic behavior, information and externalities

Game theory and strategic behavior – Asymmetric information and decision making-moral hazard and adverse selection – network externalities – markets with network externalities – implication for business.

Unit-V: Macro environment of business

National income – its determinants, aggregate consumption function and multiplier – income level and consumption spending hypotheses – concept and phases of business cycle.

Practical

Review of theory of consumer behavior – calculation of elasticities and business applications – Derivation of demand functions – Derivation of supply functions – Producer and consumer surplus and business implications – Estimation of production function – Least cost combination – derivation of cost curves from production function – Risk analysis – Equilibrium prices under different market conditions – Monopoly, Monopolistic competition, Oligopoly and cartels – Consumption of factor prices and factor shares – Analysis of trends in national income – Inflation – calculation of price indices and policies – Impact of fiscal policies on business environment – impact of monetary policies on business environment.

Theory Schedule

1. Derivation of demand – Hicksian and Slutsky analysis
2. Recent developments in the theory of market demand – dynamic version – demand functions
3. Linear expenditure system (LES) – Almost ideal demand system model.
4. Production functions-returns to scale-law of variable proportion
5. Technical progress and production functions
6. Theory of costs and business applications of cost analysis.
7. Perfect and imperfect markets – equilibrium of firm and pricing under dynamic changes in demand and costs
8. Criticism of neo-classical theory of the firm – Managerial and behavioral theories of firm.
9. Mid Semester Examination
10. Managerial and behavioral theories of firm
11. Game theory and strategic behavior
12. Asymmetric information and decision making-moral hazard and adverse selection –
13. Network externalities – markets with network externalities
14. Implication for business.
15. National income – its determinants, aggregate consumption function and multiplier
16. Income level and consumption spending hypotheses
17. Concept and phases of business cycle.

Practical Schedule

1. Review of theory of consumer behavior
2. Calculation of elasticities and business applications
3. Derivation of demand functions
4. Derivation of supply functions
5. Producer and consumer surplus and business implications
6. Estimation of production function
7. Least cost combination – derivation of cost curves from production function
8. Risk analysis
9. Equilibrium prices under different market conditions – Monopoly
10. Monopolistic competition
11. Oligopoly and cartels
12. Consumption of factor prices and factor shares
13. Analysis of trends in national income
14. Inflation – calculation of price indices and policies
15. Impact of fiscal policies on business environment
16. Impact of monetary policies on business environment.
17. Case studies on fiscal and monetary policies.

References

1. Manker V.G., 2004, Business Economics, Macmillan Publishing India Ltd., New Delhi.
2. Hendrikse, G., 2003, Economics and Management of organizations: Co-ordination, Motivation and Strategy, MaGraw-Hill, New Delhi.
3. Bishop, M., 2004, Privatisation and Economic Performance, Oxford University Press, New Delhi.
4. Milgrom, P, & Roberts, J., 2002, Economics, Organization and Management, Prentice Hall of India, New Delhi.
5. Jayaprakash Reddy R, Advanced Business Economics, 2004, APH Publishing Corporation, New Delhi.

ABM 814: AGRI BUSINESS SECTOR ANALYSIS (2+1)

Objective

- To update the scholars with various advancements in agribusiness sector
- To expose with needed management strategies
- To enhance performance of agro industries in the domestic and international contexts

Theory

Unit-I: Agri-Input Sector

Market structure - nature of competition - pricing - subsidy - government intervention for agri-inputs. Seeds - growth. Issues and policies. Fertilizer - issues, supply, subsidy- Micronutrients. Pesticides - market for new molecules, herbicides and bio-control. Farm machineries and equipments - Irrigation and micro irrigation equipments - Machineries and implements. Food processing and bio-energy - market, subsidy and policies.

Unit-II: Food processing and manufacturing Sectors

Trends in food processing and manufacturing - management problems of food processors - trends in food retail and wholesaling - specialization and diversification in food markets. Organic food industry in India - sugar, dairy, and poultry sectors - issues and prospects.

Unit-III: Agri services

Agri-business consultancy and technology transfer, finance (venture capital, microfinance) - marketing services - research and development in agribusiness industries. Private sector initiatives in agri-service sectors - Agribusiness information portals - nature of information offered and spread. Certification agencies in organic agriculture - food safety. Publications and Periodicals in agribusiness.

Unit-IV: Exports and Imports

Exports and Imports of Agrl. Commodities - government policies on export and import of Agrl. Commodities - WTO regulations related to agribusiness and its implications on agribusiness industries.

Unit-V: Environment Analysis

Economic environment and agribusiness development, climate change and agribusiness development, climate change and agribusiness development - IPR and other regulations and agribusiness development. Government intervention - Policies - agribusiness development. Public private partnership models for agribusiness development. Infrastructure and agribusiness development.

Practical

Identifying agri-business opportunities - market structure, conduct and performance analysis model-Porters five forces model on competitiveness - Seed sector analysis - Sector analysis of fertilizer, pesticides, farm machineries, irrigation systems, non-conventional energy systems - Brand management for processed food products - farmers' preference for agri consultancy firms - Capital requirement assessment for agribusiness ventures - marketing services - policy analysis for agribusiness development - impact analysis of climate change and implications for agribusiness - analysis of infrastructure requirement for agribusiness.

Theory Lecture Schedule

1. Market structure, nature of competition, pricing, subsidy, government intervention with reference to the following agri-inputs.
2. Seeds - growth, issues and policies.
3. Fertilizer - issues, supply, subsidy, Micronutrients
4. Pesticides - market for new molecules
5. Herbicides and bio-control
6. Farm machineries and equipments
7. Irrigation and micro irrigation equipments, machineries and implements.
8. Bioenergy - market, subsidy and policies.
9. Trends in food processing and manufacturing
10. Management problems of food processors

11. Major fruits and vegetables markets in India
12. Trends in food wholesaling - specialization and diversification in food markets
13. Organic food industry in India
14. Sugar, dairy and poultry sectors - issues and prospects
15. Sugar, dairy and poultry sectors - issues and prospects
16. Agri-business consultancy and technology

17. Mid-semester examination

18. Financial institutions and policies promoting agribusiness (venture capital micro
19. marketing services , research and development in agribusiness industries.
20. Private sector initiatives in agri-service sectors
21. Agribusiness information portals - nature of information offered and spread.
22. Certification agencies in organic agriculture - food safety.
23. Publications and Periodicals in agribusiness.
24. Food grain markets- Markets for fruits and vegetables
25. Commodity market analysis- rice, wheat, spices.
26. Commodity market analysis – Cotton, sugar, Palamolein, turmeric, Groundnut oil, maize.
27. Government Policies on export and import of Agrl. commodities
28. Exports and imports of Agrl. Commodities – WTO regulations related to agribusiness and its implications on agribusiness industries
29. Economic environment and agribusiness development
30. Climate change and agribusiness development
31. IPR and other regulations and agribusiness development
32. Government intervention and policies and agribusiness development
33. Public private partnership models for agribusiness development
34. Infrastructure and agribusiness development

Practical Schedule

1. Identifying agri-Business opportunities
2. Discussion on market structure, conduct and Performance analysis model
3. Porters five forces model on competitiveness
4. Seed sector analysis
5. Fertilizer sector – forecasting and market structure analysis
6. Pesticides sector analysis
7. Sector analysis for few farm machineries
8. Market segmentation for irrigation systems
9. Brand management for processed food products
10. Market analysis for non-conventional energy systems
11. Farmers' preference for agri-consultancy firms
12. Capital requirements assessment for agribusiness ventures
13. Case analysis on Marketing Services –I
14. Case analysis on marketing Services – II

15. Policy analysis for agribusiness development
16. Impact analysis of climate change and implications for agribusinesses
17. Analysis of infrastructure requirements for agribusiness

References

1. Porter, Michael E, 1998, Competitive Advantage : Creating and Sustaining Superior Performance, Free Press, New York, USA.
2. Porter, Michael E, 1990, The Competitive Advantage of Nations, free press, New York, USA.
3. The Global Competitiveness Report, 2007, World Economic Forum and Harvard Institute for International Development, Geneva, Switzerland.
4. NIIR, 2005, Hand Book on agro Based Industries, NIIR Publications, New Delhi.
5. Sharma D. D., 2005, Total Quality Management, Sultan Chand & Sons, New Delhi.

ABM 821: FINANCIAL MANAGEMENT AND PROJECT ANALYSIS (2+1)

Objective

- To impart knowledge on advanced financial managerial tools and techniques
- To explain method to formulate project and management techniques

Theory

Unit-I: Financial Functions and Decisions

Objective of the firm – sustainable wealth creation. Strategic financial management investment or long term asset mix decisions – liquidity or short term mix decisions – efficiency of capital and money markets – shareholders versus management.

Unit-II: Asset Valuation

Valuation of equity shares, preference shares, debentures and bonds, convertible securities. Approaches to valuations – Earnings dividend growth model. Net asset value – meaning and interpretation.

Unit-III: Financial and Profit Analysis

The theory of capital structure – long and short term finance implications (debt and equity) – leasing versus borrowing – foreign finance – analysis of changes in financial position – cost – volume – profit analysis and operating leverage – breakage analysis profit planning – fund flow and cash flow analysis.

Unit-IV: Project Appraisal

Capital budgeting decisions – Capital assets – replacement and acquisition – capital budgeting techniques – issues in investment appraisal – differing project life cycles – Capital rationing – possibility of abandonment or expansion – impact of inflation – Net work techniques – social cost benefit analysis – environmental impact assessment – mutually exclusive projects.

Unit –V: Financial Risk Management

Risk assessment – risk aversion with many commodities – measures of risk aversion in the small and large firms – their economic consequences – An aggregation theorem for securities markets – portfolio allocation with many risky assets – The role of securities in the optimal allocation of risk bearing – economic equilibrium under uncertainty – investment decisions under uncertainty – capital investment in stock portfolios and capital budgets – The valuation of risky assets and the selection of risky investment in stock portfolios and capital budgets – Incomplete

financial markets accounts receivable – inventories – accounts payable – overall working strategy (conservative, aggressive).

Practical

Capital efficiency evaluation – asset valuation – approaches to valuation – earnings dividend growth model – valuation of net asset – cost – volume profit analysis and operating leverage – capital budgeting techniques – capital rationing – analysis of impact of inflation on investment – risk assessment – economic equilibrium under uncertainty – Investment decision under uncertainty – capital work techniques – social cost benefit analysis – environmental impact assessment – analysis of mutually exclusive projects.

Theory Lecture Schedule

1. Financial Function and objective of the firm.
2. Market efficiency and strategic financial management.
3. Valuation of equity shares, preference shares, debentures and bonds, convertible securities.
4. Approaches to valuations – earnings, dividends growth model.
5. Net asset value – meaning and interpretations.
6. The theory of capital structure – long and short-term finance implications (debt and equity) Leasing versus borrowing.
7. Foreign finance.
8. Analysis of changes in financial position.
9. Cost volume profit analysis – Breakdown analysis.
10. Operating Leverage profit Planning.
11. Capital budgeting decisions. Capital assets – Replacement and Acquisition.
12. Fund flow analysis.
13. Cash flow analysis.
14. Issues in investment appraisal.
15. Differing project life cycles.
16. Capital rationing. Possibility of abandonment or expansion.
- 17. Mid semester examination**
18. Impact of inflation on investment.
19. Net work techniques –I.
20. Net work techniques –II.
21. Social cost benefit analysis –I.
22. Social cost benefit analysis –II.
23. Environmental impact assessment –I.
24. Environmental impact assessment –II.
25. Mutually exclusive projects.

26. Risk assessment and measures of risk aversion in the small and the large firms.
27. An aggregation theorem for securities Markets – portfolio allocation with many risky assets.
28. The role of securities in the optimal allocation of risk bearing – economic equilibrium under uncertainty.
29. Investment decisions under uncertainty.
30. The valuation of risky assets and the selection of risky investments in stock portfolios and capital budgets.
31. Incomplete financial markets and indeterminacy of competitive equilibrium.
32. Management of working capital.
33. Accounts receivable inventories.

Practical Schedule

1. Capital efficiency evaluation.
2. Asset valuation.
3. Approaches to valuation.
4. Earnings dividend growth model.
5. Valuation of net asset – cost – volume profit analysis and operating leverage –I.
6. Valuation of net asset – cost – volume profit analysis and operating leverage –II.
7. Breakeven analysis.
8. Capital rationing.
9. Analysis of impact of inflation on investment.
10. Risk assessment – economic equilibrium under uncertainty – investment decision under uncertainty.
11. Capital asses pricing model.
12. Valuation of risky assets.
13. Working capital management.
14. Net work techniques.
15. Social cost benefit analysis.
16. Environmental impact assessment.
17. Analysis of mutually exclusive projects.

References

1. Eugene Brigham and Michacel C. Ehrhardt, 2005, Financial Management Text and Cases. SW Cengage Learning India Pvt. Ltd., New Delhi.
2. Khan M. Y. And P.K. Jain, 2002, Financial Management, Tata Mc-Graw Hill, New Delhi.
3. Prasanna Chandra, 2008, Financial Management, Tata Mc-Graw Hill, New Delhi.
4. Pandey, I.M, 2000, Financial Management, Vikras Publishing House Pvt. Ltd., New Delhi.
5. Goel, B.B., 1999, Project Management, Deep & Deep Publications, New Delhi.

ABM 822: HUMAN RESOURCE MANAGEMENT AND ORGANISATIONAL BEHAVIOUR (2+1)

Objective

- To make scholars to be aware of the advancements in human resource Management
- To analyse research techniques with special reference to agribusiness secto.

Theory

Unit – I: Human Resource Management

Evolution of HRM – Growth of HRM in the new millennium – Systems approach to HRM – Impact of technology on HRM – Strategic HRM and competitive advantage – Human resource planning and assessment.

Unit – II: Recruitment, Selection, Training and Development

Job designing – concept – designing jobs to meet the needs of employer and employee – e-recruitment and their merits and demerits – strategies of recruitment – recruiting diverse work force – recent trends in recruitment – use of psychometric tests in selection – HR outsourcing and its impact on human practices – need and importance of training – checklist – areas and types of training – training needs assessment – evaluation methods of training methods – recent trends in training – management development – need and methods of management development.

Unit – III: Career and Performance Management

Career development – career planning and development process – roles in career planning – management of career paths – standards of performance – performance metric – designing metrics – HR valuation – dimensions of performance – performance appraisal – methods – errors and biases – performance counselling – competency modelling.

Unit – IV: Understanding Behaviour In Organization

Theories of behaviour – personality determinants and assessment – perceptual process – attitude and values measurement and application – expectancy theory – comparison of Maslow's and Alderfer's ERG theory . Predicting and controlling behaviour . Emotional intelligence and big five model of personality. Groups and group dynamics. Team building research in team building – Leadership – perspective theories and research domains. Communication, negotiation, NLP and conflict resolution strategies.

Unit – V: Organization Culture

Organization culture, structure and organizational development – Organizational effectiveness – cross cultural issues and impact of globalization on organizational behaviour.

Practical

Application of HR forecasting techniques – testing the reliability and validity of psychometric tests – training needs assessment – evaluation methods of training – application of job evaluation methods – designing effective performance appraisal system – developing a competency model – establishing and fixing compensation – valuation of human capital by *Lev & Schwartz model*– tackling union issues – case studies – critical analysis on case studies of various corporate on the issues of HRM – identification of research problem, reviewing the current research on HRM – presentation and writing articles – project work on HR issues – applications of management and behavioural sciences – personality determinants and assessment – emotional intelligence and big five model of personality – assessment of organizational effectiveness.

Theory Lecture Schedule

1. Evolution of HRM and growth of HRM in the new millennium
2. Systems approach to HRM and impact of technology on HRM
3. Strategic HRM and competitive advantage
4. Human resource planning and assessment
5. Concept of Job designing, designing jobs to meet the needs of employer and employee
6. e-recruitment and their merits and demerits
7. Strategies of recruitment, recruiting diverse work force, recent trends in recruitment practices
8. Use of psychometric tests in selection
9. HR outsourcing, Its impact on Human resource practices
10. Need and importance of training and development, training Checklist to avoid pitfalls, training need assessment
11. Evaluation methods of training, recent trends in training
12. Concept, importance and methods of management development
13. Career planning, merits, demerits and processes, Career development programmes
14. Roles in career planning, employee and employers role and
15. Management of career paths
16. Performance metric and designing metrics, dimensions of performance, errors and biases, performance counselling,
17. Mid semester examination
18. Competency modelling
19. Theories of behaviour, personality determinants and assessment,
20. Emotional intelligence
21. Big five model of personality

22. Perception perceptual process, application of perception
23. Attitude, measurement of attitudes
24. Values, measurement and application
25. Theories of motivation
26. Expectancy theory – comparison of Maslow's and Alderfer ERO theory,
27. Predicting and controlling behaviour
28. Groups and group dynamics, team building research in team building
29. Leadership – perspective theories
30. Research domains in leadership, communication, negotiation
31. NLP and their application
32. Conflicts, conflict resolution strategies
33. Organizational culture, structure and organizational development
34. Organizational effectiveness. Cross cultural issues and impact of globalization on organizational behaviour

Practical Schedule

1. Application of HR forecasting techniques
2. Testing the reliability and validity of psychometric tests
3. Training needs assessment
4. Evaluation methods of training
5. Application of job evaluation methods
6. Designing effective performance appraisal system
7. Developing a competency model
8. Establishing and fixing compensation
9. Valuation of human capital by **Lev & Schwartz model**
10. Tackling union issues-case studies
11. Critical analysis on case studies of various corporate on the issues of HRM
12. Identification of research problem, reviewing the current research on HRM
13. Presentation and writing articles
14. Project work on HR issues
15. Application of management and behaviour science
16. Application of five big models and personality
17. Assessment of organizational effectiveness

References

1. Garry Dressler, Biju Varkkey, 2009, Human Resource Management, Prentice Hall, New Delhi.
2. V.S.P Rao, 2005, Human Resource Management Text and cases, Excel Books, New Delhi.
3. Stephen Robbins, 2008, Organizational Behaviour, Prentice Hall of India, New Delhi.
4. Debra L. Nelson and Campbell Quick, 2006, Organizational Behaviour, Cengage Learning India Private Limited, New Delhi.
5. Don Hellriegel, Susan E Jackson, John W Slocum, 2007, Management: A Competency-Based Approach, Cengage Learning India Private Ltd., New Delhi.

ABM 823 • SUPPLY CHAIN AND LOGISTICS MANAGEMENT IN AGRIBUSINESS

(2+1)

Objective

- To expose the scholars to various research prospects advancements available in supply chain
- To understand logistic management in agri business

Theory

Unit-1: Supply Chain Management

Supply Chain Management (SCM) - Metrics/Drivers and obstacles - SCM networks - Distribution network - SC Inventories - Inventory planning with known and uncertain demand - Coordination in SCM - Bullwhip effect - Green and global supply chain.

Unit-II: Procurement Management In Agribusiness Industries

Role of purchasing in business- purchasing control- budgeting- sourcing, quality. quality control - contract buying, retail buying state and institutional purchasing international buying, make or buy negotiations, value analysis - measuring purchasing performance. Strategic purchasing management - developing lean supply, partnership sourcing - network sourcing benchmarking - information technology in purchasing

Unit-III: Performance Measurement. Controls and Information Technology for SCM

Performance modeling of supply chains using different techniques - mathematical programming models for supply chain planning, design, and optimization - best practice supply chain solutions internet enabled supply chains . e marketplaces - e procurement - e logistics - customer relationship management, web services - supply chain automation and integration

Unit-IV: Commodity Market Analysis

Food grain markets - markets for fruits and vegetables - commodity market analysis -rice, wheat, Spices, cotton, sugar, palmolein, turmeric, groundnut oil, maize - futures and option market in agriculture seasonal commodity patterns - risk management in Agri commodity markets - structural models of commodity price

Unit-V: logistics Management

Organizing logistics function - measurement of performance of logistics functions - logistics operation, its importance and effectiveness – integrated logistics management- third party alliance - Multimodal Transport System in India. Warehousing – classes of warehouse , functions and operations of a warehouse - third party logistics – 4PL service providers

Practical

Supply chain performance measurement - inventory planning with known and uncertain demand - bullwhip effect - quality management - value analysis measurement and analysis of customer satisfaction - mathematical programming models for supply chain planning ,design and optimization - supply chain integration - commodity markets - fundamental and technical analysis – relationship management case study warehousing management

Theory Lecture Schedule

1. SCM Metrics/Drivers and obstacles
2. SCM networks and distribution network
3. SC Inventories- Inventory planning with known and uncertain demand
4. Coordination in SCM
5. Value of and distortion of information Bullship effect
6. Green and global supply chains
7. Role of purchasing in business purchasing control, budgeting
8. Sourcing quality, quality control
9. Contract buying retail buying state and institutional purchasing international buying
10. Make or buy decisions, negotiations and value analysis
11. Strategic purchasing management
12. Developing lean supply, partnership sourcing, network souring, benchmarking,
13. Role of information technology in purchasing
14. Performance modeling of supply chains using different techniques
15. Mathematical programming models for supply chain planning, design, and optimization
16. Best practice supply chain solutions
- 17. Mid semester examination**
18. Internet-enabled supply chains - e-marketplaces, e-procurement, e- logistics
19. Customer relationship management
20. Supply chain automation and integration.
21. Fundamental and technical analysis of commodity markets
22. Futures and option market in agriculture- seasonal commodity patterns
23. Risk management in Agri, commodity markets
24. Structural models of commodity Prices
25. Managing Agri, risk in developing countries
26. Organizing logistics function
27. Measurement of performance of logistics functions
28. Logistics operation, its importance and effectiveness
29. Integrated logistics management - Third party alliance
30. Multimodal transport system in India
31. Warehousing- classes of warehouse
32. Functions and operations of a warehouse - consolidation. Break-bulk. Cross-docking,

- mixing, assembly.
- 33. Third party logistics
- 34. 4PL service providers.

Practical Schedule

1. Supply chain performance measurement
2. Inventory planning with known demand
3. Inventory' planning uncertain demand
4. Demonstration of Bullwhip effect
5. Purchasing management - case analysis
6. Quality management - case study
7. Value analysis measurement
8. Analysis of customer satisfaction
9. Supply chain coordination - case analysis
10. Mathematical programming models for supply chain planning, design, and optimization
11. Mathematical programming models for supply chain planning, design, and optimization
12. Supply chain integration analysis
13. Customer relationship management - case analysis
14. Measurement of performance of supply chains
15. Commodity markets fundamental analysis
16. Commodity markets technical analysis
17. Warehousing management case study

References

- 1 .Byron J. Finch. 2008, *Operations Now Supply Chain Management and Prrftttmancr*. Tata Me Grnw Hill, New Delhi
2. J William J. Stevenson, 2002, *Operations Management*. Tata Mr-Grow Hill. New Delhi.
- 3 Gopalaknshnan.P and Sundaresan M, 2000, *Matenals Management An Integrated Approach'*, Prentice Hall of India Ltd . New Delhi
- 4 Chases, Jacobs and Aquilano, 2004, *OperationsIWanof/eineiiffor compehtwe Advantage*, Tain MC Graw Hills, New Delhi
- 5 Joel D Wisner, G. Kenong Leong, KenhChoon Tan, 2005, *Principles of Supply Chain Management: A Balanced Approach*. CengugeIxnmng India Pvt Ltd., New Delhi.

COM 811 – ADVANCES IN COMPUTER APPLICATIONS (1+1)

Objectives

- To understand the concepts of computer and their peripheral, to get knowledge in office like MS Word and MS Excel.
- To make them acquire sound knowledge in various Agricultural statistical software ;and their analysis.
- To improve knowledge to get exposed to the current trends in Internet and their usage.

Theory

Unit I: Data Processing

Introduction to MS Office – MS Word and MS Access – Data analysis using MS Word and MS Access – Introduction to various statistical packages – Preparation of data for computer analysis – data feeding.

Unit II: Data Analysis through MS Excel

Computer programme for Agrl. Science – Applied analyses – EXCEL – Measures of central tendency – mean, median, mode – measures of dispersion – standard deviation, variance – correlation – inferential tests for difference of mean – Z test inferential parametric test for significance – F-test, t-test, ANOVA, regression – inferential non parametric tests for significance – chi-square, Mann-whitney – optimization using MS-EXCEL solver.

Unit-III: SPSS Bases System Modules

SPSS basics – creating, editing data file – descriptive statistics – cross tabulation – chi-square analyses – bivariate correlation – ANOVA procedures – simple and multiple regression analysis – non parametric procedure – factor analysis – cluster analysis – discriminative analysis.

Unit IV: Agriculture Statistical Software

SAS, MSTST, IRRISTAT, AGRES, AGRISTAT, STATISTICA, MANOVA AND MANCOVA.

UNIT V: World Wide Web (WWW)

World Wide Web (WWW) – definition, getting the connectivity, service provider working with Internet and Intranet – Web pages, web sites, web servers – Web application.

Practical

Using EXCEL for Inferential tests for difference of mean – inferential parametric test for significance – chi-square, mann-whitney – optimization using MS-Excel solver – multiple regression analysis using SPSS – factor analysis – cluster analysis – discriminate analysis – MANOVA and MANCOVA – logistics regression – SAS, MSTAT, IRRISTAT – AGRES, AGRISTAT – STATISTICA – Exposure to Internet and their for research analysis.

Theory Lecture Schedule

1. Introduction to MS Office – MS Word and MS Access.
2. Data analysis using MS Word and MS Access – Introduction to various statistical packages.
3. Preparation of data for computer analysis – data feeding.
4. Computer programme for Agrl. Science – Applied analyses.
5. EXCEL – Measures of central tendency – mean, median, mode – measures of dispersion – standard deviation, variance – correlation – inferential tests for difference of mean.
6. Z test inferential parametric test for significance – F-test, t-test, ANOVA
7. Regression – inferential non parametric tests for significance
8. Chi-square, Mann-whitney – optimization using MS-EXCEL solver.
9. Mid Semester Examination
10. SPSS basics – creating, editing data file – descriptive statistics – cross tabulation – chi-square analyses – bivariate correlation
11. ANOVA procedures – simple and multiple regression analysis – non parametric procedure –
12. Factor analysis – cluster analysis – discriminative analysis.
13. SAS, MSTST, IRRISTAT
14. AGRES, AGRISTAT
15. STATISTICA, MANOVA AND MANCOVA.

16. World Wide Web (WWW) – definition, getting the connectivity, service provider working with Internet and Intranet
17. Web pages, web sites, web servers – Web application.

Practical Schedule

1. Using EXCEL for Inferential tests for difference of mean
2. Inferential parametric test for significance
3. Chi-square, mann-whitney
4. Optimization using MS-Excel solver
5. Multiple regression analysis using SPSS
6. Factor analysis
7. Cluster analysis
8. Discriminate analysis
9. MANOVA and MANCOVA
10. Logistics regression
11. SAS
12. MSTAT
13. IRRISTAT
14. AGRES
15. AGRISTAT
16. STATISTICA
17. Exposure to Internet and their for research analysis.

References

1. Kapoor V.K. 2004. Introduction to Computers and Information Systems. New Delhi: Sul-ton Chand and Sons.
2. Karthy Jacobs. 2007 “Microsoft Office Excel”, The Express Line to Learning, Wiley Chand & Sons, New Delhi.
3. Peter Norton’s 2001, “Introduction to Computer (4th Edition)”, Tata McGraw-Hill Publishing Company Limited, New Delhi.
4. TNAU 2004, “Advanced Quantitative Techniques and Data Analysis” Training Manual – Agrl. Engineering College and Research Institute, Coimbatore.
5. Darren George and Paul Mallery, 2009 “SPSS for Windows” Pearson Education, London.
6. <http://en.wikipedia.org/wiki/Internet>.

STA 821: ADVANCED STATISTICAL METHODS FOR SOCIAL SCIENCES

(2+1)

Objectives

- This course is aimed for students to get an exposure to concepts of statistical methods, probability distribution and statistical inference.

Theory

Unit I: Probability

Theory of probability, Random variable, mathematical expectation. Discrete and continuous probability distributions. Binomial, poisson, negative binomial, normal distribution and their applications.

Unit II: Sampling Methods

Concept of sampling; SRS stratified sampling, cluster sampling, PPS sampling, multistage sampling. Concept of sampling distribution chi-square, t, F. Tests of significance based on normal, t, Y^2 and F.

Unit III: Correlation and Regression

Correlation and Regression: Simple and multiple linear regression model, estimation of parameters, predicted values and residuals. Partial correlation and multiple correlations, rank correlation, test of significance of correlation coefficients and regression coefficients.

Unit IV: Non-Parametric Tests

Non-parametric tests – single and two sample problems. Friedman two-way ANOVA. Distribution free tests – advantages – disadvantages – run test – test for randomness – Median test – Sign test – Mann Whitney U test for two samples – Kolmogorov Smirnov one sample test, Kruskal – Walli's test – chi-square – correlation coefficients – regression coefficients – Standard error – Significance tests – Students t and F distribution.

Unit V: Discrimination Function

Hotelling's T^2 , classification problems, discrimination function. D^2 statistics and its applications. Principal component analysis, canonical correlations. Cluster analysis and factor analysis. Simulation methods: Resampling methods jack knife and the bootstrap. MCMC methods and Gibbs sampler.

Practical

Estimation – Determination of sample size in simple random sampling – stratified random sampling – Cluster sample – selection – Estimation – Multistage sampling – Selection – Estimation of parameters in two stage sampling – Determination of sample size in two stage sampling – Application of double sampling – Method of least squares – Moving averages – Kolmogorov – Smirnov test – Rank correlation coefficient – Forecasting using regression technique – Construction of index numbers of Agrl. Production.

Theory Lecture Schedule

1. Theory of probability
2. Random variable
3. Mathematical expectation.
4. Discrete and continuous probability distributions.
5. Binomial
6. Poisson
7. Negative binomial
8. Normal distribution and their applications.
9. Concept of sampling
10. SRS stratified sampling, cluster sampling, PPS sampling, multistage sampling.
11. Concept of sampling distribution chi-square, t, F.
12. Tests of significance based on normal, t, Y^2 and F.
13. Correlation and Regression
14. Simple and multiple linear regression model
15. Estimation of parameters
16. Predicted values and residuals.

17. Mid Semester Examination
18. Partial correlation
19. Multiple correlations
20. Rank correlation
21. Test of significance of correlation coefficients
22. Regression coefficients.
23. LS method
24. MLE method
25. Friedman two-way ANOVA.
26. Hotelling's T^2
27. Discrimination function.
28. D^2 statistics and its applications.
29. Principal component analysis
30. Canonical correlations.
31. Cluster analysis and factor analysis.
32. Resampling methods jack knife and the bootstrap.
33. Simulations method
34. MCMC methods and Gibbs sampler.

Practical Schedule

1. Sampling techniques – Simple random sampling – Estimation of mean and variance.
2. Cluster sampling, quota sampling, population proportionate to size sampling.
3. Estimation of mean and variance in cluster sampling.
4. Stratified sampling.
5. Estimation of total and variance of total in two stage sampling with SRS at both stages.
6. Estimation of moving trend by moving average method and least square method.
7. Estimation of seasonal variation by simple average method.
8. Seasonal variation by ratio to trend method, seasonal indices by link relative method.
9. Non-parametric statistics an introduction.
10. Run test and sign test.
11. Kolmogorov smirnov one sample test and two sample test.

12. Mann-Whitney U test and Kruskal Walli's test.
13. Correlation coefficients of tests of significance.
14. Regression coefficients of tests of significance.
15. Construction of different wighted index numbers-Reversal test.
16. Principal Component Analysis (PCA)
17. Cluster Analysis.

References

1. Agarwal, B.L. (2009) – Basic Statistics, New Delhi: New Age International Publishers Pvt. Ltd.
2. Biswas, S. (2001)- Topics in Statistical Methodology, New Delhi; New Age International Publishers Pvt. Ltd
3. Rajagopalan,V. (2006)-Selected Statistical Tests, New Delhi; New Age International Publishers Pvt. Ltd
4. Rangasamy,R. (2000)-A Textbook of Agrl. Statistical, New Delhi; Wiley Eastern Ltd.
5. Siegel, John N & Casallan.Jr (2000) – Non-Parametric tests for Behaviour Science, New Delhi; John Wiley Publisers.
6. Venkatesan, D., K. Senthamaraikannan (2006) – Basic Statistical Methods, Chennai; Spitech Publishers.