M.Sc.
Computer Software

Prospectus No. 20161210

संत गाडगे बाबा अमरावती विद्यापीठ

SANT GADGE BABA AMRAVATI UNIVERSITY

विज्ञान विद्याशाखा
(FACULTY OF SCIENCE)

PROSPECTUS

OF

MASTER OF SCIENCE IN
COMPUTER SOFTWARE

Semester-I & Semester III Winter 2015,
Semester-II & Semester IV Summer 2016

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M.Sc.Part-I & Part-II (Semester I to IV) Examinations in Computer Software

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SANT GADGE BABA AMRAVATI UNIVERSITY

SPECIAL NOTE FOR INFORMATION OF THE STUDENTS

(1) Notwithstanding anything to the contrary, it is notified for general information and guidance of all concerned that a person, who has passed the qualifying examination and is eligible for admission only to the corresponding next higher examination as an ex-student or an external candidate, shall be examined in accordance with the syllabus of such next higher examination in force at the time of such examination in such subjects papers or combination of papers in which students from University Departments or Colleges are to be examined by the University.

(2) Be it known to all the students desirous to take examination/s for which this prospectus has been prescribed should, if found necessary for any other information regarding examinations etc., refer the University Ordinance Booklet the various conditions/provisions pertaining to examination as prescribed in the following Ordinances.

Ordinance No. 1	:	Enrolment of Students.
Ordinance No. 2	:	Admission of Students
Ordinance No. 4	:	National cadet corps
Ordinance No. 6	:	Examinations in General (relevent extracts)
Ordinance No. 18/2001	:	An Ordinance to provide grace marks for passing in a Head of passing and Inprovement of Division (Higher Class) and getting Distinction in the subject and condonation of defficiency of marks in a subject in all the faculties prescribed by the Statute NO.18, Ordinance 2001.
Ordinance No. 9	:	Conduct of Examinations (relevent extracts)
Ordinance No. 10	:	Providing for Exemptions and Compartments
Ordinance No. 19	:	Admission of Candidates to Degrees.
Ordinance No. 109	:	Recording of a change of name of a University student in the records of the University.

Ordinance No.19/2001	:	An Ordinance for Central Assessment Programme, Scheme of Evaluation and Moderation of answerbooks and preparation of results of the examinations, conducted by the University, Ordinance 2001.

Registrar
Sant Gadge Baba Amravati University.

PATTERN OF QUESTION PAPER ON THE UNIT SYSTEM.

The pattern of question paper as per unit system will be broadly based on the following pattern

(1) Syllabus has been divided into units equal to the number of question to be answered in the paper. On each unit there will be a question either a long answer type or a short answer type.

(2) Number of question will be in accordance with the unit prescribed in the syllabi for each paper i.e. there will be one question on each unit.

(3) For every question long answer type or short answer type there will be an alternative choice from the same unit. However, there will be no internal choice in a question.

(4) Division of marks between long answer and short answer type question will be in the ratio of 40 and 60

(5) Each short answer type question shall contain 4 to 8 short sub question with no internal choice.

%ORDINANCE NO. 4 of 2008

Examinations leading to the Degree of विज्ञान पारंगत (Master of Science)(Four Semesters Degree Course), Ordinance, 2008.

Whereas it is expedient to provide an Ordinance regarding Examinations leading to the Degree of **विज्ञान पारंगत** (Master of Science) (Four Semesters Degree Course), in the faculty of Science. The Management Council is hereby pleased to make the following Ordinance.

1. This Ordinance may be Called, "Examinations leading to the Degree of **विज्ञान पारंगत** (Master of Science) (Four Semesters Degree Course), Ordinance, 2008".
2. This Ordinance shall come into force w.e.f. the date of its approval by the Management Council.
3. The duration of the course shall be two academic years,
   (a) M.Sc. Course is divided into Semester-I, Semester-II, Semester-III & Semester-IV.
   (b) University shall hold examinations in Winter and in Summer every year for all semesters.
   (c) The main examination of odd semesters shall be held in Winter and the main examination of even semesters shall be held in Summer every year. The supplementary examination for odd semesters shall be held in Summer and the supplementary examination for even semesters shall be held in Winter every year.
4. The period of Academic Session/Term shall be such as may be notified by the University and the Examination shall be held at such places and on such dates as may be fixed by the Board of Examinations.
5. Subject to their compliance with the provisions of this Ordinance and of other Ordinances in force from time to time, the following persons shall be eligible for admission to the examinations, namely:-
   (A) For विज्ञान पारंगत भाग-१ प्रथम सत्र M.Sc.Part-I:-
      (a) A collegiate candidate admitted to the Degree of Bachelor of Science who has prosecuted a regular course of study in a college or a University Department.
      (b) a teacher admitted to the Degree of Bachelor of Science and eligible under Ordinance No. 18;
      (c) a woman candidate admitted to the Degree of Bachelor of Science, who has not pursued a course of study in the University or a College;

% As approved by Management Council on dated 30.5.2008, Vide Item No. 196, and latest amended vide Ordinance No. 14 of 2009 (M.C. dated 25.5.09)

Provided that, applicants eligible under clauses (b) and (c) above shall, if laboratory work is prescribed in the subject which they offer for examination, attend the full course of laboratory instruction in the University Department or a College or a recognised Institution imparting instruction upto the standard of the examination;

Provided further, that in the case of applicants under clauses(b) and (c) above, not less than one academic year shall have elapsed since the date of their passing the examination for the Degree of विज्ञान स्नातक (Bachelor of Science);

(d) Candidate who has passed B.Sc.Examination of Sant Gadge Baba Amravati University with Chemistry as one of the optional subjects and has also passed the Diploma of Associateship of Institution of Chemists (India) Calcutta and is working as Jr/Sr.Laboratory Asstt. in National Environmental Engineering Research Institute, Nagpur (NEERI) or Council of Scientific and Industrial Research (CSIR), Nagpur or Indian Bureau of Mines (IBM) will be eligible to appear at M.Sc.Semester-I in Chemistry only, without prosecuting a regular course of study in a College/ Department in the University.

Provided he produces certificate of completion of practical course prescribed for M.Sc. Part-I (Semester-I & Semester-II) Examination in Chemistry from his employer.

(e) any other graduate in Science not eligible under clause (a) (b) or (c) above, shall be eligible for admission to the examination in Mathematics only, after a lapse of not less than one academic year since the date of his passing the examination for the Degree of विज्ञान स्नातक (Bachelor of Science):

(f) an applicant holding the भेषजी स्नातक (B.Pharm) or the विज्ञान स्नातक कृषी (B.Sc.Agri.) Degree shall be eligible for admission to the विज्ञान पारंगत (M.Sc.) Course in Biochemistry only;

(Note: The विज्ञान स्नातक (B.Sc.) Degree referred to in clause (a) above, shall include the विज्ञान स्नातक (B.Sc.) Degree of the University or an equivalent Degree of any other Statutory University)

(g) an applicant holding the B.Sc. (Ind.Chem.) Degree of the Banaras Hindu University;

(h) an applicant holding B.A./B.Sc. with Mathematics/ Statistics or Bachelor of Computer Science Degree for admission to M.Sc. Course in Statistics or Mathematics ;

(i) i) for admission to M.Sc. Microbiology a candidate shall have offered Microbiology or Industrial Microbiology or Biochemistry as a subject of study and examination at the B.Sc. degree.

ii) for admission to M.Sc. Biochemistry a candidate shall have offered Microbiology or Industrial Microbiology or Biochemistry as a subject of study and examination at the B.Sc. degree.

For admission to M.Sc.Biochemistry, in case of vacancies, a students offering Chemistry alongwith Biological Science shall be admitted.

(j) i) for admission to M.Sc. Electronics (Instrumentation) a candidate shall have offered Physics or Electronics (Instrumentation) or Electronics or Electronics Science or Computer Maintenance as subjects of study and examination at the B.Sc. level and B.C.S. degree of this University or any other equivalent Degree of Statutory University.

ii) a person passing B.E. (Electronics & Telecommunication or Industrial Electronics) Examination of Sant Gadge Baba Amravati University is eligible to take admission direcltly at second year of M.Sc. Electronics (Instrumentation). Such a student who is admitted to second year of M.Sc. Electronics (Instrumentation) shall be awarded M.Sc. degree on the basis of his performance at M.Sc. Part-II only.

(k) for admission to (M.Sc.) Geography a candidate shall have offered Geography as a subject to study and examination at the B.Sc. Degree.

(l) for admission to (M.Sc.) Petrochemical Science, a candidate shall have offered Petrochemical Science subject to study and examination at the B.Sc. Degree.

(m) i) for admission to M.Sc. Part-I (Environmental Science) a candidate shall have offered one of the optional subject as Environmental Science or Botany or Zoology or Life Sciences or Microbiology or Biochemistry or Biotechnology at B.Sc. degree,

ii) Sixty percent seats of the total intake shall be reserved for students who have passed B.Sc. with Environmental Science. If students having Environmental Science as an optional subject are not available then students having other optional subjects be considered.

(n) for admission to M.Sc. Geoinformatics or Remote Sensing and GIS, a candidate shall have passed B.Sc. in any discipline of Life Sciences. Preference shall be given to graduates having offered Geology at undergraduate level.

(o) for admission to M.Sc. Bioinformatics a candidate shall have passed B.Sc. in any discipline of Life Sciences, Bio Sciences or Bachelor Degree in Agriculture, Veternary and Fishery Sciences, Pharmacy, or Medical Sciences - Bachelor of Medicine and Bachelor of Surgery, Bachelor of Dental Surgery, B.A.M.S., B.H.M.S. or any equivalent examination recognised by Sant Gadge Baba Amravati University.

(B) For विज्ञान पारंगत भाग-२ (M.Sc. Part-II) Examination:-

(a) a student who has been admitted to the Degree of विज्ञान स्नातक (Bachelor of Science) and who has since passing the M.Sc.Part-I (Semester-I & II) Examinations, prosecuted a regular course of study for not less than one academic year in the University or in the College in the subject in which he offers himself for the M.Sc.Part-II Examinations;

(b) a teacher admitted to the Degree of विज्ञान स्नातक (Bachelor of Science) and eligible under Ordinance

No. 18 and who has not less than one academic year previously, passsed the M.Sc.Part-I Examination in the subject in which he offers himself for M.Sc.Part-II Examinations;

(c) a woman candidate admitted for the Degree of विज्ञान स्नातक (Bachelor of Science) and who has not less than one academic year previously, passed the M.Sc. Part-I Examination in that subject in which she offers herself for the M.Sc. Part-II Examinations;

(d) a candidate who has been admitted under Para 3 (A) (d) above and who has not less than one academic year previously, passed M.Sc. Part-I Examination in the subject Chemistry in which he offers himself for the M.Sc.Part-II Examination.

Provided he produces a certificate of completing of practical course prescribed for M.Sc. Part-II Examination in Chemistry from his empolyer;

(e) any other Graduate in Science not eligilbe under clause (a) (b) or (c) who has not less than one academic year presiously, passed the M.Sc. Part-I (Semester-I & Semester-II) Examinations in the subject which he offers himself for the Part-II Examination;

6. Subject to his / her compliance with the provisions of this Ordinance and other Ordinances (Pertaining to Examination in General) in force from time to time, the applicant for admission, at the end of the course of study of a perticular term shall be eligible to appear at it, if,

(i) he / she satisfied the conditions in the table and the provisionsthereunder.

(ii) he / she has prosecuted a regular course of study in the university / college affiliated to the university.

(iii) he / she has in the opinion of the Head of the Department / Principal shown satisfactory progress in his / her study.

Name of Exam.	The student should have passed the Examination of satisfactory	The student should have completed the session/semester
M.Sc.Part-I(Semester-I) examination	The qualifying mentioned in para 5	M.Sc.Part-I (Semester-I)
M.Sc.Part-I (Semester-II)		M.Sc.Part-I (Semester-I & II)
M.Sc.Part-II (Semester-III)	Semester-I	M.Sc.Part-II (Semester-III)
M.Sc.Part-II (Semester-IV)	Semester-I	M.Sc.Part-II (Semester-III & IV)

7. Without prejudice to the provisions of Ordinance No.6 relating to the Examinations in General, the provisions of Paragraphs 8,10, and 31 of the said Ordinance shall apply to every collegiate candidate.

8. The fee for each Semester Examination shall be as prescribed by the University time to time.

Provided that a non-collegiate candidate, other than an ex-student shall also pay a registration fee as prescribed by the University time to time.

9. Every candidate for admission to the examination shall offer one of the following subjects for his examination, namely-

(1) Mathematics,
(2) Physics,
(3) Chemistry,
(4) Botany,
(5) Zoology,
(6) Geology,
(7) Statistics,
(8) Biochemistry,
(9) Microbiology,
(10) Electronics (Instrumentation),
(11) Geography,
(12) Geoinformatics,
(13) Remote Sensing & GIS,
(14) Environmental Science, and
(15) Bioinformatics.

Provided firstly, that an examinee who has passed Part-II Examination in one of the subjects listed above from 1 to 15 and is desirous of appearing.

(a) in any other subject, or

(b) in a new paper or a combination of papers in the subject in which he has passed, may, without prosecuting a regular course of study present himself in any subsequent academic year for Part-I of the Examination in that other subject or that new paper or new combination of papers, and after not less than one academic year after passing the said Part-I Examination, for Part-II Examination in the said new paper or the said new combination of papers.

Provided secondly, that a candidate eligible for appearing at a examination under the first proviso shall, in the subject or a new paper or the new combination of papers which he is offering for the examination, attend the full course of practical Training, wherever such training is prescribed in the University Department or a College or a recognised Institution imparting instruction upon the standard of the Examination.

Provided thirdly, that an examination successful under clause (b) of the first proviso shall not be awarded division nor shall he be eligible for any scholarship, medal or prize of the University.

10. An examinee at the M.Sc.Part-I or the M.Sc. Part-II Examination shall have the option of not being declared successful at the examination in case he does not secure a minimum of Second Division marks /Higher Second Division marks fifty five percent marks (55%) at the Examination. The option will have to be exercised everytime an application is submitted to any of the three examinations and shall be on the proforma printed on the application form itself. Once exercised the option shall be binding upon the examinee, and shall not be revoked under any circumstances.

11. Any person who has obtained a Third Division at the M.Sc. Examination of this University shall be eligible to take the examination again under this Ordinance in the same subject or group of subjects as the case may be for improving his division. In such a case the provisions of Ordinance No.138 relating to Improvement of Division shall apply.

12. (1) The scope of the subject shall be as indicated in the syllabus.

(2) The medium of instruction and examination shall be English.

13. The number of papers and marks alloted to each subject and the minimum marks which an examinee must obtain in order to pass the examination shall be as indicated in Appendix-óÂô

14. Examinees who are sucessful in the M.Sc. Semester-I, II, III & IV Examination and have obtained not less than 60% marks in the aggregate of the M.Sc. Semester-I, II, III & IV Examinations taken together shall be placed in the First Division, those obtained less than 60% but not less than 55% marks, in the Higher Second Division, those obtained less than 55% but not less than 48% marks, in the Second Division, and all other successful examinees, in the Third Division.

15. Provision of Ordinance No. 18 of 2001 relating to the an Ordinance to provide grace marks for passing in a Head of passing and improvement of division (higher class) and getting distinction in the subject and Condonation of Deficiency of Marks in a subject in all the faculty prescribed by the Statute No.18, Ordinance, 2001, shall apply to the examinations under this ordinance.

16. As soon as possible after the examination, but not later than 30th, June next following, the Management Council shall publish a list of successful examinees arranged in Three Divisions. The names of examinees passing the examination as a whole in the minimum prescribed period and obtaining the prescribed number of places in each subject in the First or Second Division, shall be arranged in Order of Merit as provided in the Examinations in General Ordinance No.6.

17. Save as provided in Paragraph 11 of this ordinance, no person shall be admitted to an examination under this ordinance, if he has already passed the same examination of this University or an equivalent examination in M.Sc. Part-I (Semester-I & II), and M.Sc. Part-II (Semester-III & IV) of any other Statutory Univerisity.

18. Examinees successful at the M.Sc. Part-I (Semester-I & II), and M.Sc. Part-II (Semester-III & IV) shall on payment of the prescirbed fees, be entitled for the award of the respective Degree in the prescribed form, signed by the Vice-Chancellor.

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(Note : - " P.G. Workload in the faculty shall be as per Ordinance No. 131.")

APPENDIX-A
SCHEME OF EXAMINATION FOR M.Sc. PART-I & II.
(FOR ALL SUBJECTS)

i) M.Sc. Part-I	Paper-I	-	50 Marks	Practical-I	-	40 Marks
Semester-I	Paper-II	-	50 Marks	Internal Assessment	-	10 Marks
	Paper-III	-	50 Marks	Practical-II	-	40 Marks
	Paper-IV	-	50 Marks	Internal Assessment	-	10 Marks
M.Sc. Part-I	Paper-V	-	50 Marks	Practical-III	-	40 Marks
Semester-II	Paper-VI	-	50 Marks	Internal Assessment	-	10 Marks
	Paper-VII	-	50 Marks	Practical-IV	-	40 Marks
	Paper-VIII	-	50 Marks	Internal Assessment	-	10 Marks
M.Sc. Part-II	Paper-IX	-	50 Marks	Practical-V	-	40 Marks
Semester-III	Paper-X	-	50 Marks	Internal Assessment	-	10 Marks
	Paper-XI	-	50 Marks	Practical-VI	-	40 Marks
	Paper-XII	-	50 Marks	Internal Assessment	-	10 Marks
M.Sc. Part-II	Paper-XIII	-	50 Marks	Practical-VII	-	40 Marks
Semester-IV	Paper-XIV	-	50 Marks	Internal Assessment	-	10 Marks
	Paper-XV	-	50 Marks	Project Work	-	40 Marks
	Paper-XVI	-	50 Marks	Internal Assessment	-	10 Marks

ii) For the subject Mathematics, there shall be five theory papers of sixty marks for each semester.

Notes:-(1) Minimum pass marks for theory and practical examination including internal assessment shall be 36% separately.

(2) (a) Topic of project work shall be given by concerned supervisor with prior approval of Head of Department.
There shall be no duplication of the topic of the project work. Project shall be based on research in the laboratory
and / or field work. Project work shall be allotted at the beginning of third semester and the student shall have to
submit it atleast 15 days before commencement of practical examination of the fourth semester. Project work will be
evaluated by external and internal examiners.

(b) There should be atleast 2 to 3 external examiner for a batch of 10 students or 3 to 5 external examiner for a batch
more than 10 students.

(3) There shall be seperate exemption in theory and / or practical on getting minimum pass marks.

(4) Internal Assessment marks for all semesters shall be granted on the basis of - performance of students in any of the following activities:-
(i) Study tour, (ii) Seminar, (iii) field visits, (iv) Industrial visits, (v) visit to research institute / organisation.
(vi) Assignments, (vii) Unit test and any other co-curricular activities.

(5) The concerned Department or College shall have to maintain the record of award of internal assessment marks.

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DIRECTION

No. : 14 / 2009 Date : 29.6.2009

Subject : Examinations leading to the Degree of विज्ञान पारंगत (Master of Science) (Four Semester Degree Course), Direction, 2009.

Whereas, Ordinance No.4 of 2008 in respect of Examinations leading to the Degree of विज्ञान पारंगत (Master of Science) (Four Semester Degree Course) Ordinance, 2008 is in existance in the University.

AND

Whereas, the Board of Studies in Computer Science (including Computer Application and Computer Science (Computer Software)) in the faculty of Science in its meeting held on 5.6.2009 has resolved to accept revised syllabi of M.Sc. Semester-I to IV Computer Software, eligibility criteria and other details.

AND

Whereas, the Board of Studies further recommended that the scheme of examination will be applicable as per Ordinance No.4 of 2008 to M.Sc. Computer Software, as it is, and the revised syllabi shall be implemented from the academic session 2009-10 expeditiously in the light of advancement of knowledge in the subject.

AND

Whereas the Hon'ble Vice-Chancellor has accepted the revised syllabi of M.Sc. Computer Software, Eligibility criteria, Scheme of examinations and other details under section 14(7) of the Maharashtra Universities Act, 1994 on behalf of the faculty of Science and Academic Council.

AND

Whereas, Original Ordinance No.4 of 2008 is required to be amended for inclusion of the above said course.

AND

Whereas, the matter for the admission to student at the examination of above said course is required to be regulated by an Ordinance, and making amendments in Ordinance is time consuming process.

Now, therefore, I, Dr. Kamal Singh, Vice Chancellor of Sant Gadge Baba Amravati University, in exercise of powers conferred upon me under sub-section (8) of section 14 of the Maharashtra Universities Act., 1994, do hereby direct as under:

1. This Direction may be called ñExaminations leading to the Degree of विज्ञान पारंगत (Master of Science) (Four Semester Degree Course), Direction, 2009ò.

2. This direction shall come into force from the date of its issuance.

3. Eligibility criteria for admission to M.Sc. Computer Software shall be as given below.

   ñA person who has passed the Degree of Bachelor of Science with Computer Science/Vocational Computer Application Subjects

   OR

   A person who has passed the Degree of Bachelor of Science with Post Graduate Diploma in Computer Science of this University

   OR

   An Examination Recognised as an equivalent of this University or of any other statutory University.ò

4. The Scheme of Examination for M.Sc. Computer Software shall be as per Ordinance No.4 of 2008 as other Science subjects, as it is.

Amravati

Date : 29/6/2009

Sd/
(Dr.Kamal Singh)
Vice-Chancellor

*****

DIRECTION

No. : 26 / 2010 Date : 24/06/2010

Subject : Scheme for Choice Based Credit System (CBCS) and Awarding Grades to the Post Graduate Students in the Faculty of Science, Direction, 2010.

Whereas, University Grants Commission, New Delhi vide D.O.No.F-2/2008/(XI Plan), Dtd.31 Jan.2008 regarding new initiatives under the 11th Plan ï Academic Reforms in the University has suggested for improving quality of higher education and to initiate the Academic Reform at the earliest.

AND

Whereas, the Academic Council while considering the above letter in its meeting held on 30.4.2008, vide item No.55 has resolved to refer the same to Deanôs Committee, and the Deanôs Committee in its meeting held on 19.07.2008 has decided to refer the matter to all Board of Studies.

AND

Whereas, the recommendations of various Board of Studies in the faculty of Science regarding Upgradation and Revision of various syllabi and introduction of choice based credit pattern Examination System at post graduate level was considered by the faculty of Science in its meeting held on 7.12.2009 and constituted a Committee of all Chairmen of Board of Studies and one member nominated by Chairmen of respective B.O.S. under the Chairmanship of Dean of faculty to decide the policy decision regarding choice based credit system examination pattern at P.G. level.

AND

Whereas, the faculty of Science in its emergent meeting held on 11th May, 2010 vide item No.27, has considered, accepted and recommended to Academic Council, the policy decision regarding introduction of Scheme for Choice Based Credit System (CBCS) and Awarding Grades to the Post Graduate Students in the Faculty of Science under ordinance No.4 of 2008. The recommendations of the faculty was approved by the Academic Council in its emergent meeting held on 28.5.2010, vide item No.36.

AND

Whereas, Ordinance No.4 of 2008 in respect of Examinations leading to the Degree of विज्ञान स्नातक (Bachelor of Science) is in existence in the University as per semester pattern examination system.

AND

Whereas, it is necessary to frame the Regulation regarding the Scheme for Choice Based Credit System (CBCS) and Awarding Grades to the Post Graduate Students in the Faculty of Science which is to be implemented from the Academic Session 2010-11 of M.Sc.Semester-I & onwards to all subjects in the faculty of Science and framing of Regulation for the above examination is likely to take some time.

AND

Whereas, the admission of students in the above pattern at M.Sc. Part-I (Semester-I) of all subjects in the faculty of Science are to be made in the Academic Session 2010-11.

Now, therefore, I, Dr. Kamal Singh, Vice Chancellor of Sant Gadge Baba Amravati University, in exercise of powers conferred upon me under sub-section (8) of section 14 of the Maharashtra Universities Act., 1994, do hereby direct as under:

1. This Direction may be called ñScheme for Choice Based Credit System (CBCS) and Awarding Grades to the Post Graduate Students in the Faculty of Science, Direction, 2010.
2. This Direction shall come into force with effect from the examination as shown below for all subjects for the Examinations leading to the Degree of Master of Science in the faculty of Science-
   (i) Winter 2010 examination for M.Sc. Part-I, Semester-I,
   (ii) Summer-2011 examination for M.Sc. Part-I, Semester-II,
   (iii) Winter-2011 examination for M.Sc. Part-II, Semester-III,
   (iv) Summer-2012 examination for M.Sc. Part-II, Semester-IV.
3. The detailed Scheme for Choice Based Credit System (CBCS) and Awarding Grades to the Post Graduate students in the Faculty of Science is as given below-

I. The CBCS System

All Programmes (named after the Core subject) mentioned in para 9 of Ordinance No.4 of 2008 shall be run on Choice Based Credit System (CBCS) and the grades in 7 point scale will be awarded to the students. It is an instructional package developed to suit the needs of students to keep pace with the developments in higher education and the quality assurance expected of it in the light of liberalization and globalization in higher education.

II. Credits and Degrees

i) A candidate who has successfully completed all the core courses Compulsory, Elective/ Specialised courses and project prescribed and optional approved by the University for the programme

and accumulated not less than 72 (52 core and elective) Credits and who has put in the minimum residence time shall be eligible to receive the degree.

ii) One Credit shall mean one teaching period per week for one semester (of 16 weeks) for theory courses and one laboratory session of two periods / week for one semester. One teaching period shall be of 60 minutes duration including 10 minutes for discussion / movement.

III. Courses

(i) Core Course :- A core course is a course that a student admitted to a particular programme must successfully complete to receive the degree. There may be two kinds of core courses: The **hard-core** courses which cannot be substituted by any other course and which must be successfully completed and **soft-core** courses which may be substituted by equivalent courses from the same department. In all P.G. programmes a project with 03 credits shall be included. The project may include a viva-voce examination with a credit of 1, Normally no theory course shall have more than 4 credits.

(ii) Elective Course : Means a optional course from the basic subject or specilization.

The core credits for any P.G. programme (inclusive of hard-core, soft-core and project) shall not exceed 60 credits and shall not be less than 48 credits. Each Board of Studies shall specify the core-credit load for their respective programme apart from approving syllabi,for all the courses offered by the department.

(iii) General Interest Course (GIC)

The General Interest Course shall be the choice of student. The student who choose the GIC shall have to register for it on payment of fees as prescribed by the University.

The Departmental Committee shall follow a selection procedure on a first come first served basis, fixing the maximum number of students, after counselling to the students etc. to avoid overcrowding to particular course(s) at the expense of some other courses.

(iv) Each **Course** is designed such that it includes lectures / tutorials / laboratory or field work / Seminar / Practical training / Assignments / Term paper / Report writing or review of literature and any other innovative practice etc., to meet effective teaching and learning needs.

(v) Attendance :- Students must have 75% of attendance in each Core and Elective course for appearing the examination. However student having attendance less than 75% may apply to the H.O.D. for condonation of attendance upto 15% under the provision of para 6-A (i) of Ordinance No.6.

IV. Registration for General Interest Course :-

i) Each student, on admission shall be assigned to a faculty advisor who shall advise the student about the academic programme and counsel him on the choice of courses listed in Appendix-Q depending on his general interest, academic background and objective.

ii) With the advice and consent of the faculty advisor the student shall register for courses he plans to take for the semester before classes start. No student shall be permitted to register for courses exceeding 30 credits per semester including those of repeat courses nor shall any student be permitted to register for any course without satisfactorily completing the prerequisites for the course except with the permission of the concerned teacher in the prescribed format.

iii) If the student feels he has registered for more courses than he can handle, he shall have the option of dropping one or more of the courses he has registered for, with the consent of his advisor before the end of 3rd week of the semester. However, a student, to retain his status, should have registered at least for core course and elective course of that semester.

iv) Students, other than those freshly admitted, shall register for the courses of their choice in the preceding semester by filling in the prescribed forms.

v) The University shall prescribe the maximum number of students in each General Interest Course taking into account the teachers and Physical facilities available in the Department.

vi) The University may make available to all students a listing of all the courses offered in every semester specifying the credits, the prerequisites, a brief description or list of topics the course intends to cover, the instructor who is giving the courses, the time and place of the classes for the course. This information shall be made available on the University website.

vii) Normally no course shall be offered unless a minimum of 10 students are registered.

viii) The student shall have to pay the prescribed fee per course for the registration.

V. Programme Committee :-

There shall be the programme committee at the University level constituted as under-

i) Dean of the faculty (Chairman)

ii) Heads of all the Departments ï (Member)

iii) Three teachers from the affiliated colleges having post graduate courses other than University Department ï nominated by the Vice-Chancellor. (Member)

iv) Deputy Registrar (Acad) ï (Secretary)

Duties and responsibilities of the Programme Committee shall be as under-

i) To identify the General Interest Courses (GIC) as per the need of the student and availability of teachers in the Departments.

ii) To approve the time table of GIC and make it available to the students before the commencement of respective semester. This time table also be made available on the University website.

iii) To consider and approve the report of grivence redresal committee.

iv) To remove the difficulties if any faced during implementation of the CBCS and report it to Hon'ble Vice-Chancellor for further action.

v) Any other matter as it think fit for the effective implementation of CBCS.

VI. Departmental Committee

1. Every P.G. programme of the University/College shall be monitored by a committee constituted for this purpose by the Department.

   The Committee shall consist of H.O.D. as a Chairman and all the teachers of the Deptt. of its members including one student members per class. There shall be atleast one student member on the committee.

VII. Grievances Redressal Committee

The University or College shall form a Grievance Redressal Committee for each course in each department with the Course Teacher and the HOD. This Committee shall solve all grievances relating to the Internal Assessment marks of the students.

VIII. Total credits per semester :-

Table-I

For all subjects other than Mathematics, Biotechnology & Computer Science

Course	Credits				Total
	Sem-I	Sem-II	Sem-III	Sem-IV	
Core	12	12	12	12	48
Elective	04	04	04	04	16
GIC	00	04	04	04	12
Lab. Course	06	06	06	03	21
I.A.	04	04	04	04	16
Project	00	00	00	03	03
Total	26	26 or 30	26 or 30	26 or 30	116

Table-II

For Mathematics

Course	Credits				Total
	Sem-I	Sem-II	Sem-III	Sem-IV	
Core courses	12	12	12	12	48
Elective Courses	08	08	08	08	32
GIC	ð	04	04	04	12
Internal Assessment	05	05	05	05	20
Project	ð	ð	ð	04	04
Total	25	25 or 29	25 or 29	25 or 33	116

For Biotechnology

Course	Credits				Total
	Sem-I	Sem-II	Sem-III	Sem-IV	
Core courses	16	12	12	08	48
Elective Courses	ð	9	ð	9	18
Lab courses	24	18	18	12	72
Seminar	ð	01	01	ð	02
Project				06	06
Assignment			02		02
Internal Assessment			02		02
Total	40	40	35	35	150

Table-IV

For Computer Science

Course	Credits				Total
	Sem-I	Sem-II	Sem-III	Sem-IV	
Core	25	20	15	10	70
Elective	-	05	05	05	15
GIC	-	-	05	-	05
Lab. Course	06	06	06	03	22
I.A.	-	-	-	02	02
Project	-	-	-	04/02	06
Total	31	31	31	26	119

IX. Grade Awards :-

(i) A seven point rating scale is used for the evaluation of the performance of the student to provide letter grade for each course and overall grade for the Masterôs Programme. Grade points are based on the total number of marks obtained by him/her in all the heads of examination of the course. These grade points and their equivalent range of marks are shown separately in Table-I. The performance of the student in theory, practical, internal assessment, subjects shall be evaluated in accordance with following Table-I.

TABLE –I

Grade	**Range of Marks obtained out of 100 or Equivalent fraction**	**Grade Points**	**Remarks** (Not to be displayed On transcripts)
O	**90-100**	**10**	**Outstanding**
A+	**80-89**	**9**	**Excellent**
A	**70-79**	**8**	**Very Good**
B+	**60-69**	**7**	**Good**
B	**55-59**	**6**	**Fair**
C+	**50-54**	**5**	**Average**
C	**40-49**	**4**	**Below Average**
F	**Below 40**	**0**	**Fail**

TABLE-II: Final Grade Points for SGPA and CGPA

Grade Points	Final Grade	Remarks (Not to be displayed On transcripts)
9.00-10.00	**O**	**Outstanding**
8.00 – 8.99	**A+**	**Excellent**
7.00-7.99	**A**	**Very Good**
6.00-6.99	**B+**	**Good**
5.50 – 5.99	**B**	**Fair**
5.00 – 5.49	**C+**	**Average**
4.00 – 4.99	**C**	**Below Average**

Equivalence of the conventional division/class with the CGPA is in accordance with the following table no. 4.

Table III. Equivalence of Class/Division to CGPA

Sr.No.	CGPA	Class/Division
1	8.00 or more	First Class ï Exemplary
2	7.50 or more but less than 8.00	First Class with Distinction
3	6.00 or more but less than 7.49	First Class
4	5.50 or more but less than 5.99	Higher Second Class
5	4.00 or more but less than 5.49	Second Class
6	Less than 4.00	Fail

The overall performance of a student is evaluated by assigning appropriate weightage to all the ***four*** semesters in order to maintain the quality of education. A student is permitted to appear for the semester examination subject to he or she has a minimum attendance of 75% in theory and practical classes, completes all his/her internal/ sessional assignments and clears all his/her dues. Non appearance in any examination is treated as the student having secured zero mark in that subject examination.

The evaluation is based on an average weightage system. Every subject has credit points based on the hours of study required. Every student is assessed in a subject with appropriate weightage to internal/sessional work and semester examination, thereby making the students study regularly. Every student is awarded Grade points out of maximum 10 points in each subject (based on 7 Points Scale). Based on the Grade points obtained in each subject, Semester Grade Point Average (SGPA) and then Cumulative Grade Point Average (CGPA) are computed.

X. Computation of SGPA & CGPA

Every student will be awarded points out of maximum 10 points in each subject. (based on 7 Points Scale). Based on the Grade points obtained in each subject the Semester Grade Point Average (SGPA) and then Cumulative Grade Point Average (CGPA) are computed. The computation of SGPA & CGPA, is as under:

Semester Grade Point Average (SGPA) is the weighted average of points obtained by a student in a semester and is computed as follows:

$$SGPA = \frac{U1 \times M1 + U2 \times M2 + ... + Un + Mn}{U1 + U2 + ...Un}$$

Where U1, U2, é .. are subject credit of the respective course and M1, M2, é .. are the Grade Points obtained in the respective subject (out of 10)

The Semester Grade Point Average (SGPA) for all the four semesters is also mentioned at the end of every semester.

The Cumulative Grade Point Average (CGPA) is used to describe the overall performance of a student in the course and is computed as under:

$$CGPA = \frac{\sum_{n=1}^{4} SGPA(n)C_n}{\sum_{n=1}^{n=4} C_n}$$

Where SGPA (n) is the nth Semester SGPA of the student and C_{-n} is the nth Semester total credit. The SGPA and CGPA are rounded off to the second place of decimal.

XI. Internal Evaluation Method :-

(i) At the beginning of each course, every teacher shall inform his/her students unambiguously the method he/she proposes to adopt for the continuous assessment. Normally the teacher concerned may conduct three written sessional examinations spread periodically during the semester and select best two for contributing to the final marks.

(ii) At the end of each semester the Departmental Committee shall assign grades to the students.

(iii) The Departmental Committee shall prepare the copies of the result sheet in duplicate.

(iv) Every student shall have the right to scrutinize answer scripts of sessional/end-semester examinations and seek clarifications from the teacher regarding eveluation of the scripts immediately thereafter or within 3 days of receiving the evaluated scripts.

(v) The Department shall display the grade points and grades for the notice of students.

(vi) The department shall send all records of evaluation, including sessional evaluation, for safekeeping to the Controller of Examinations as soon as all the formalities are over.

XII. Grade Card

The University shall issue at the beginning of each semester a grade card for the student, containing the grades obtained by the student in the previous semester and his Semester Grade Point Average (SGPA).

The grade card shall list:

(a) the title of the courses along with code taken by the student

(b) the credits associated with the course,

(c) the grade and grade points secured by the student,

(d) the total credits earned by the student in that semester.

(e) the SGPA of the student,

(f) the total credits earned by the students till that semester and

(g) the CGPA of the student (At the end of the IVth Semester).

XIII. At the end of the IVth semester, the University shall issue the statement of marks to the Students showing details of marks obtained by the student in each Head in each semester along with grade total marks.

XIV. Power to modify and remove difficulties :-

1. Not withstanding anything contained in the foregoing, Hon'ble V.C. in consultation with the Dean of the faculty shall have the power to issue directions or orders to remove any difficulty,

2. Nothing in the foregoing may be construed as limiting the power of the University to amend, modify or repeal any all of the above.

sd/-

Amravati (Dr.Kamal Singh)

Date : 2/6/2010 Vice-Chancellor

Appendix-A

Examination Scheme under C.B.C.S. for the subject other than Mathematics, Biotechnology and Computer Science in the faculty of Science

M.Sc. Part-I

Semester-I

SA-Subject abbrivation; C-Core; E-Elective

Sr.No.	Paper / Code	Course	Theory				Practical		
			Max. Marks (Credits)	Min Pass Marks (Min. Grade Pt.)	Int. Ass. (Credits)	Min. Pass Marks (Min. Grade Pt.)	Th + Int. Ass. Min.Pass Mar (Grade Pt.)	Max. Marks (Credit)	Min. Marks marks (Min. Grade Point)
1	2	3	4	5	6	7	8	9	10
1	1SA-1	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
2	1SA-2	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
3	1SA-3	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
4	1SA-4	E	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
5	1SA-5	Lab-I	ð	ð	ð	ð	ð	100 (03)	40 (04)
6	1SA-6	Lab-II	ð	ð	ð	ð	ð	100 (03)	40 (04)

Total Marks : 600; Minimum Total Credits : 26

Note :- (1) If the student has scored minimum marks or minimum grade points mentioned in Column No.8 out of the sum of total marks of theory and internal assessment taken together then he/she will be declared to have cleared with (04+01) 05 credits.

(2) If the student has scored minimum marks or minimum grade points in either theory or in internal assessment then he/she will be declared to have cleared in that particular head.

Appendix-B

Examination Scheme under C.B.C.S. for the subject other than Mathematics, Biotechnology and Computer Science in the faculty of Science

M.Sc. Part-I

Semester-II

SA-Subject abbrivation; C-Core; E-Elective; GIC-General Interest Course

Sr.No.	Paper / Code	Course	Theory				Practical		
			Max. Marks (Credits)	Min Pass Marks (Min. Grade Pt.)	Int. Ass. (Credits)	Min. Pass Marks (Min. Grade Pt.)	Th + Int. Ass. Min.Pass Mar (Grade Pt.)	Max. Marks (Credit)	Min. Marks marks (Min. Grade Point)
1	2	3	4	5	6	7	8	9	10
1	2SA-1	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
2	2SA-2	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
3	2SA-3	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	
4	2SA-4 Or 2GIC-X	E and/or GIC	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
5	2SA-5	Lab-III	ð	ð	ð	ð	ð	100 (03)	40 (04)
6	2SA-6	Lab-IV	ð	ð	ð	ð	ð	100 (03)	40 (04)

Total Marks : 600; Minimum Total Credits : 26

Note :- (1) If the student has scored minimum marks or minimum grade points mentioned in Column No.8 out of the sum of total marks of theory and internal assessment taken together then he/she will be declared to have cleared with (04+01) 05 credits.

(2) If the student has scored minimum marks or minimum grade points in either theory or in internal assessment then he/she will be declared to have cleared in that particular head.

Appendix-C

Examination Scheme under C.B.C.S. for the subject other than Mathematics, Biotechnology and Computer Science in the faculty of Science

M.Sc. Part-II

Semester-III

SA-Subject abbrivation; C-Core; E-Elective; GIC-General Interest Course

Sr.No.	Paper / Code	Course	Theory				Practical		
			Max. Marks (Credits)	Min Pass Marks (Min. Grade Pt.)	Int. Ass. (Credits)	Min. Pass Marks (Min. Grade Pt.)	Th + Int. Ass. Min.Pass Mar (Grade Pt.)	Max. Marks (Credit)	Min. Marks marks (Min. Grade Point)
1	2	3	4	5	6	7	8	9	10
1	3SA-1	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
2	3SA-2	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
3	3SA-3	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
4	3SA-4 Or 3GIC-Y	E and/or GIC	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
5	3SA-5	Lab-V	ð	ð	ð	ð	ð	100 (03)	40 (04)
6	3SA-6	Lab-VI	ð	ð	ð	ð	ð	100 (03)	40 (04)

Total Marks : 600; Minimum Total Credits : 26

Note :- (1) If the student has scored minimum marks or minimum grade points mentioned in Column No.8 out of the sum of total marks of theory and internal assessment taken together then he/she will be declared to have cleared that (04+01) 05 credits.

(2) If the student has scored minimum marks or minimum grade points in either theory or in internal assessment then he/she will be declared to have cleared in that particular head.

Appendix-D

Examination Scheme under C.B.C.S. for the subject other than Mathematics, Biotechnology and Computer Science in the faculty of Science

M.Sc. Part-II

Semester-IV

SA-Subject abbrivation; C-Core; E-Elective; GIC-General Interest Course

Sr.No.	Paper / Code	Course	Theory				Practical		
			Max. Marks (Credits)	Min Pass Marks (Min. Grade Pt.)	Int. Ass. (Credits)	Min. Pass Marks (Min. Grade Pt.)	Th + Int. Ass. Min.Pass Mar (Grade Pt.)	Max. Marks (Credit)	Min. Marks marks (Min. Grade Point)
1	2	3	4	5	6	7	8	9	10
1	4SA-1	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
2	4SA-2	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
3	4SA-3	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
4	4SA-4 Or 4GIC-Z	E and/or GIC	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)	ð	ð
5	4SA-5	Lab-V	ð	ð	ð	ð	ð	100 (03)	40 (04)
6	4SA-6	Project	ð	ð	ð	ð	ð	100 (03)	40 (04)

Total Marks : 600; Minimum Total Credits : 26

Note :- (1) If the student has scored minimum marks or minimum grade points mentioned in Column No.8 out of the sum of total marks of theory and internal assessment taken together then he/she will be declared to have cleared with (04+01) 05 credits.

(2) If the student has scored minimum marks or minimum grade points in either theory or in internal assessment then he/she will be declared to have cleared in that particular head.

Appendix-E

Examination Scheme under C.B.C.S. for the subject Mathematics in the faculty of Science

M.Sc. Part-I

Semester-I

Sr.No.	Paper / Code	Course	Theory				
			Max. Marks (Credits)	Min Pass Marks (Min. Grade Pt.)	Int. Ass. (Credits)	Min. Pass Marks (Min. Grade Pt.)	Th + Int. Ass. Min.Pass Mar (Grade Pt.)
1	2	3	4	5	6	7	8
1	1MTH-1	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
2	1MTH-2	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
3	1MTH-3	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
4	1MTH-4	E	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
5	1MTH-5	E	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
			400 (20)		100 (05)		

Total Marks : 500; Total Credits : 25

Note :- (1) If the student score Minimum Marks or Minimum Grade Points mentioned in Column No.8 out of the sum total marks of theory and internal assessment taken together then he/she will be declared to have clear (04+01) 05 credits.

(2) If the student score Minimum Marks or Minimum Grade Points in either theory or internal assessment then he/she will be declared to have clear either of the head.

Appendix-F

Examination Scheme under C.B.C.S. fors the subject Mathematics in the faculty of Science

M.Sc. Part-I

Semester-II

Sr.No.	Paper / Code	Course	Theory				
			Max. Marks (Credits)	Min Pass Marks (Min. Grade Pt.)	Int. Ass. (Credits)	Min. Pass Marks (Min. Grade Pt.)	Th + Int. Ass. Min.Pass Mar (Grade Pt.)
1	2	3	4	5	6	7	8
1	2MTH-1	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
2	2MTH-2	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
3	2MTH-3	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
4	2MTH-4	E	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
5	2MTH-5 and/or 2GIC-X	E and/or GIC	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
			400 (20)		100 (05)		

Total Marks : 500; Total Credits : 25

Note :- (1) If the student score Minimum Marks or Minimum Grade Points mentioned in Column No.8 out of the sum total marks of theory and internal assessment taken together then he/she will be declared to have clear (04+01) 05 credits.

(2) If the student score Minimum Marks or Minimum Grade Points in either theory or internal assessment then he/she will be declared to have clear either of the head.

Appendix-G

Examination Scheme under C.B.C.S. for the subject Mathematics in the faculty of Science

M.Sc. Part-II

Semester-III

Sr.No.	Paper / Code	Course	Theory				
			Max. Marks (Credits)	Min Pass Marks (Min. Grade Pt.)	Int. Ass. (Credits)	Min. Pass Marks (Min. Grade Pt.)	Th + Int. Ass. Min.Pass Mar (Grade Pt.)
1	2	3	4	5	6	7	8
1	3MTH-1	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
2	3MTH-2	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
3	3MTH-3	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
4	3MTH-4	E	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
5	3MTH-5 and/or 3GIC-Y	E and/or GIC	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
			400 (20)		100 (05)		

Total Marks : 500; Min.Total Credits : 25

Note :- (1) If the student score Minimum Marks or Minimum Grade Points mentioned in Column No.8 out of the sum total marks of theory and internal assessment taken together then he/she will be declared to have clear (04+01) 05 credits.

(2) If the student score Minimum Marks or Minimum Grade Points in either theory or internal assessment then he/she will be declared to have clear either of the head.

Appendix-H

Examination Scheme under C.B.C.S. for the subject

Mathematics in the faculty of Science

M.Sc. Part-I

Semester-IV

Sr.No.	Paper / Code	Course	Theory				
			Max. Marks (Credits)	Min Pass Marks (Min. Grade Pt.)	Int. Ass. (Credits)	Min. Pass Marks (Min. Grade Pt.)	Th + Int. Ass. Min.Pass Mar (Grade Pt.)
1	2	3	4	5	6	7	8
1	4MTH-1	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
2	4MTH-2	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
3	4MTH-3	C	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
4	4MTH-4	E	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
5	4MTH-5 and/or 4GIC-Z and/or Project	E and/or GIC and/or Project	80 (04)	32 (04)	20 (01)	08 (04)	40 (04)
			400 (20)		100 (05)		

Total Marks : 500; Min.Total Credits : 25

Note :- (1) If the student score Minimum Marks or Minimum Grade Points mentioned in Column No.8 out of the sum total marks of theory and internal assessment taken together then he/she will be declared to have clear (04+01) 05 credits.

(2) If the student score Minimum Marks or Minimum Grade Points in either theory or internal assessment then he/she will be declared to have clear either of the head.

Appendix-I

Scheme of Teaching and Examination under C.B.C.S. for the Subject Biotechnology
M.Sc. (Biotechnology) SEMESTER PATTERN
M.Sc.Part-I (SEMESTER-I)

T: Lectures, P: Practical, TU: Tutorial/Assignment; G.I.C. – General Interest Course

S N	Subject Code	Paper	Course	Hrs/ Week		Credits		Examination Scheme								
								Theory					Practical			
				T	P/ TU	Theory	Pract.	Paper Hrs	Max External; Marks	Max Internal Marks	Total	Min Passing Grade Points	Max Marks Practical	Max Marks Int. Ass	Total	Min Passing Grade Points
1	1BTB-1	I	C	04	06	04		3	100		100	4	--	--	--	--
2	1BTB-2	II	C	04	06	04		3	100		100	4	--	--	--	--
3	1BTB-3	III	C	04	06	04		3	100		100	4	--	--	--	--
4	1BTB-4	IV	C	04	06	04		3	100		100	4	--	--	--	--
5	1BTB-5	Lab-I		--	P 01		12	--	--	--	--	-	80	20	100	5
6	1BTB-6	Lab-II		--	P 02		12	--	--	--	--	--	80	20	100	5
				16	24	16	24				400				200	

Total Credits: 40

Appendix-J

Scheme of Teaching and Examination under C.B.C.S. for the Subject Biotechnology
M.Sc. (Biotechnology) SEMESTER PATTERN
M.Sc.Part-I (SEMESTER-II)

T: Lectures, P: Practical, TU: Tutorial/Assignment; G.I.C. – General Interest Course

S N	Subject Code	Paper	Course	Hrs/ Week		Credits		Examination Scheme								
								Theory					Practical			
				T	P/ TU	Theory	Practical	Paper Hrs	Max Theory	Max Internal	Total	Min Passing Grade Points	Max Marks Practical	Max Marks Int. Ass	Total	Min Passing Grade Points
1	2BTB-1	V	C	04	06	4		3	100		100	4	--	--	--	--
2	2BTB-2	VI	C	04	06	4		3	100		100	4	--	--	--	--
3	2BTB-3	VII	C	04	06	4		3	100		100	4	--	--	--	--
4	2BTB-4 and/or 2GIC-X	VIII	E and/or GIC	04	06	4		3		100	100	4	--	--	--	--
5	2BTB-5	Lab-III			P 02		12	--	--	--	--	--	80	20	100	5
6	2BTB-6	Lab-IV			P 02		12	--	--	--	--	--	80	20	100	5
		Total		16	25	16	24				400				200	

Total Credits: 40

Appendix-K

Scheme of Teaching and Examination under C.B.C.S. for the Subject Biotechnology
M.Sc. (Biotechnology) SEMESTER PATTERN
M.Sc.Part-II (SEMESTER-III)

T: Lectures, P: Practical, TU: Tutorial/Assignment; G.I.C. – General Interest Course

S N	Subject Code	Paper	Course	Hrs/ Week		Credits		Examination Scheme								
								Theory					Practical			
				T	P/ TU	Theory	Pract.	Paper Hrs.	Max Theory	Max Internal	Total	Min Passing Grade Points	Max Marks Practical	Max Marks Int. Ass	Total	Min Passing Grade Points
1	3BTB-1	IX	C	04	06	04		3	100	--	100	4	--	--	--	--
2	3BTB-2	X	C	04	06	04		3	100	--	100	4	--	--	--	--
3	3BTB-3	XI and 3GIC-Y	C and GIC	04	06	04		3	100	--	100	4	--	--	--	--
4	3BTB-4	Lab-V			P 02		18	--	--	--	--	--	80	20	100	5
5	3BTB-5	Internal Assessment			01		02		--	--	--	--	--	75	75	5
6	3BTB-6	Assignment					02		--	--	--	--	--	50	50	5
7		Seminar			01	1		-	--	--	--	--		75	75	5
		Total		12	20	13	22	-	--	--	300	--	--	--	300	--

Total Credits: 35

Appendix-L

Scheme of Teaching and Examination under C.B.C.S. for the Subject Biotechnology
M.Sc. (Biotechnology) SEMESTER PATTERN
M.Sc.Part-II (SEMESTER-IV)

T: Lectures, P: Practical, TU: Tutorial/Assignment; G.I.C. – General Interest Course

S N	Subject Code	Paper	Course	Hrs/ Week		Credits		Examination Scheme								
								Theory					Practical			
				T	P/ TU	Theory	Pract.	Paper Hrs.	Max Theory	Max Internal	Total	Min Passing Grade Points	Max Marks Practical	Max Marks Int. Ass	Total	Min Passing Grade Points
1	4BTB-1	XII	C	04	06	04		3	100	--	100	4	--	--	--	--
2	4BTB-2	XIII	C	04	06	04		3	100	--	100	4	--	--	--	--
3	4BTB-3 and/or 4GIC-Z	XIV	E and/or GIC	04	06	04		3		100	100	4	--	--	--	--
4	4BTB-4	Lab-VI					18						80	20	100	5
5	4BTB-5	Project			06		06						200	--	200	5
		Total		12	24	12	24	-	--	--	300	--	--	--	300	--

Total Credits: 35

Appendix-M

Scheme of Teaching and Examination under C.B.C.S. for the subject Computer Science
M.Sc. (Computer) SEMESTER PATTERN
M.Sc.Part-I (SEMESTER-I)

T: Lectures, P: Practical, TU: Tutorial/Assignment; G.I.C. – General Interest Course, C-Core

S N	Subject Code	Paper	Course	Hrs/ Week		Credits		Examination Scheme								
								Theory					Practical			
				T	P/ TU	Theory	Practical	Paper Hrs	Max External; Marks	Max Internal Marks	Total	Min Passing Grade Points	Max Marks Practical	Max Marks Int. Ass	Total	Min Passing Grade Points
1	1MCS-1	I	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
2	1MCS-2	II	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
3	1MCS-3	III	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
4	1MCS-4	IV	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
5	1MCS-5	V	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
6	1MCS-6	Lab-I	-	-	7	-	03			-						
7	1MCS-7	Lab-II	-	-	7	-	03			-			100	-	100	40 4.0
		Total		25	14	25	06						100	-	100	40 4.0

Total Credits: 40

Appendix-N

Scheme of Teaching and Examination under C.B.C.S. for the subject Computer Science
M.Sc. (Computer) SEMESTER PATTERN
M.Sc.Part-I (SEMESTER-II)

T: Lectures, P: Practical, TU: Tutorial/Assignment; G.I.C. – General Interest Course, C-Core

S N	Subject Code	Paper	Course	Hrs/ Week		Credits		Examination Scheme								
								Theory					Practical			
				T	P/ TU	Theory	Practical	Paper Hrs	Max Theory	Max Internal	Total	Min Passing Grade Points	Max Marks Practical	Max Marks Int. Ass	Total	Min Passing Grade Points
1	2MCS-1	VI	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
2	2MCS-2	VII	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
3	2MCS-3	VIII	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
4	2MCS-4	IX	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
5	2MCS-5 Or 2GIC-X	X	E or GIC	5	-	5	-	3 Hrs	100	-	100	40 4.00				
6	2MCS-6	Lab-III	-	-	7	-	03	-	-	-	-					
7	2MCS-7	Lab-IV	-	-	7	-	03	-	-	-	-		100	-	100	40 4.0
				25	14	25	06						100	-	100	40 4.0

Total Credits: 40

Scheme of Teaching and Examination under C.B.C.S. for the subject Computer Science
M.Sc. (Computer) SEMESTER PATTERN
M.Sc.Part-II (SEMESTER-III)

Appendix-O

T: Lectures, P: Practical, TU: Tutorial/Assignment; G.I.C. – General Interest Course

S N	Subject Code	Paper	Course	Hrs/ Week		Credits		Examination Scheme								
								Theory					Practical			
				T	P/ TU	Theory	Pract.	Paper Hrs.	Max Theory	Max Internal	Total	Min Passing Grade Points	Max Marks Practical	Max Marks Int. Ass	Total	Min Passing Grade Points
1	3MCS-1	XI	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
2	3MCS-2	XII	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
3	3MCS-3	XIII	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
4	3MCS-4	XIV	E	5	-	5	-	3 Hrs	100	-	100	40 4.00				
5	3MCS-5 Or 3GIC-Y	XV	E or GIC	5	-	5	-	3 Hrs	100	-	100	40 4.00				
6	3MCS-6	Lab-V	-	-	7	-	03			-						
7	3MCS-7	Lab-VI	-	-	7	-	03			-			100	-	100	40 4.0
		Total		25	14	25	06						100	-	100	40 4.0

Total Credits: 35

Scheme of Teaching and Examination under C.B.C.S. for the subject Computer Science
M.Sc. (Computer) SEMESTER PATTERN
M.Sc.Part-II (SEMESTER-IV)

Appendix-P

T: Lectures, P: Practical, TU: Tutorial/Assignment; G.I.C. – General Interest Course

S N	Subject Code	Paper	Course	Hrs/ Week		Credits		Examination Scheme								
								Theory					Practical			
				T	P/ TU	Theory	Pract.	Paper Hrs.	Max Theory	Max Internal	Total	Min Passing Grade Points	Max Marks Practical	Max Marks Int. Ass	Total	Min Passing Grade Points
1	4MCS-1	XVI	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
2	4MCS-2	XVII	C	5	-	5	-	3 Hrs	100	-	100	40 4.00				
3	4MCS-3 Or 4GIC-Z	XVIII	E or GIC	5	-	5	-	3 Hrs	100	-	100	40 4.00				
4	4MCS-4	Lab-VII	-	-	7	-	03	4 Hrs	-	-	-	-	100		100	40 04
5	4MCS-5	Project	-	-	7	-	03+1			-	-	-	100	50	100	40 04
6	4MCS-6	Seminar	-	02	-	-	01+1			-	-	-	100	50	150	60 04
7	4MCS-7	Internal Assessement	-	06	-	-	02		-	-	-	40 4.00		50	50	20 04
		Total		23	14	15	11									

Total Credits: 35

Appendix-Q

List of General Interest Courses (GIC) to be opted by the student/s in Semester-II

Sr.No.	Subject	Subject Code Elective	Equivalent General Interest Course Code
1	2	3	4
1	Chemistry	2CHE3	2GIC-1
		2CHE4	2GIC-2
2	Physics	2PHY3	2GIC3
		2PHY4	2GIC4
3	Mathematics	2MTH4	2GIC5
		2MTH5	2GIC6
4	Zoology	2ZOO3	2GIC7
		2ZOO4	2GIC8
5	Botany	2BOT3	2GIC9
		2BOT4	2GIC-A
6	Statistics	2SCA3	2GIC-B
		2SCA4	2GIC-C
7	Biotechnology	2BTB3	2GIC-D
		2BTB4	2GIC-E
8	Computer Science	2CMS3	2GIC-F
		2CMS4	2GIC-G
9	Microbiology	2MCB3	2GIC-H
		2MCB4	2GIC-I
10	Electronics	2ELE3	2GIC-J
		2ELE4	2GIC-K
11	Biochemistry	2BMC3	2GIC-L
		2BMC4	2GIC-M
12	Geology	2GEO3	2GIC-N
		2GEO4	2GIC-O
13	Bioinformatics	2BIT3	2GIC-P
		2BIT4	2GIC-Q
14	Environmental Science	2ENV3	2GIC-R
		2ENV4	2GIC-S
15	Geoinformatics	2GIT3	2GIC-U
		2GIT4	2GIC-V
16	Computer Software	2CSW3	2GIC-W
		2CSW4	2GIC-1A
17	Remote Sensing and GIS	2RSG3	2GIC-1B
		2RSG4	2GIC-1C
18	Pharmaceutical	2PCH3	2GIC-1D
	Chemistry	2PCH4	2GIC-1E

Note : Title of the paper shall prescribed in the respective prospectuses.

DIRECTION

No. : 27 / 2010 Date : 24.6.2010

Subject : Examinations leading to the Degree of विज्ञान पारंगत (Master of Science) (Four Semester Degree Course), Direction, 2010.

Whereas, Ordinance No.4 of 2008 in respect of Examinations leading to the Degree of विज्ञान पारंगत (Master of Science) (Four Semester Degree Course) Ordinance, 2008 is in existance in the University.

AND

Whereas, the Academic Council in its meeting held on 28.5.2010 vide item No.36 has approved the policy decision regarding introduction of Scheme for Choice Based Credit System (CBCS) and Awarding Grades to the Post Graduate Students in the Faculty of Science, for all subjects along with Draft Regulation in this behalf.

AND

Whereas, due to implementation of Scheme for Choice Based Credit System (CBCS) and Awarding Grades to the Post Graduate Students in the Faculty of Science, the provision under Ordinance No.4 of 2008 need to be revised accordingly.

AND

Whereas, admission to students for M.Sc. Part-I (Semester-I) for all subjects in the faculty of Science are to be made in the Academic Session 2010-11 in choice based credit system (C.B.C.S.).

AND

Whereas, making amendments in Original Ordinance No.4 of 2008 is likely to take some time.

Now, therefore, I, Dr. Kamal Singh, Vice Chancellor of Sant Gadge Baba Amravati University, in exercise of powers conferred upon me under sub-section (8) of section 14 of the Maharashtra Universities Act., 1994, do hereby direct as under:

1. This Direction may be called ñExaminations leading to the Degree of विज्ञान पारंगत (Master of Science) (Four Semester Degree Course), Direction, 2010ò.
2. This direction shall come into force from the date of its issuance.
3. The word ñor Biochemistryò in clause i) of sub-para (i) of para 5 shall be deleted.
4. The title of the subject ñElectronics (Instrumentation)ò be substituted as ñElectronicsò wherever occur in the Ordinance.
5. Following shall be the eligibility criteria for admission to M.Sc. Part-I Semester-I for the subjects ï (i) Pharmaceutical Chemistry, (ii) Biotechnology, (iii) Computer Science.

(a) for admission to M.Sc. Pharmaceutical Chemistry a candidate shall have offered Chemistry or Industrial Chemistry or Biochemistry as a subject of study and examination at the B.Sc. Degree.

(b) following shall be the eligibility for admission to M.Sc. Semester-I (Biotechnology) -

(i) B.Sc. in any discipline of Life Sciences, Bio Sciences or Bachelorôs Degree in Agriculture, Veternary and fishery Sciences, Pharmacy, or Bachelor of Medicine and Bachelor of Surgery (M.B.B.S.) or Bachelor of Dental Surgery or equivalent examination recognized by Sant Gadge Baba Amravati University are eligible to appear in entrance test as given in para (iii) below.

(ii) The student should have minimum 50% marks as aggregate in the degree course.

(iii) The student will have to pass entrance examination for admission in M.Sc. Semester-I (Biotechnology) as per the Sant Gadge Baba Amravati University rules.

(c) following shall be the eligibility for admission to M.Sc. Semester-I (Computer Science) -

i. A person who has passed the Degree of Bachelor of Science of this university with Computer Science / Computer Application (Vocational) as on the subjects.

OR

ii. A person who has passed B.A. / B.Sc. with Mathematics plus Post Graduate Diploma in Computer Science of this University.

OR

iii. A person who has passed a Degree of Bachelor of Computer Science.

6. The following subject be inserted in para 9) of the Ordinance after Sr.No. ñ15. Bioinformaticsò.

ñ16. Computer Software,
17. Computer Science
18. Biotechnology, and
19. Pharmaceutical Chemistry.

7. A person who desire to improve the division obtained by him/her at M.Sc. examination shall be eligible for improvement of division under the provision of Ordinance No.6 of 2008. However, for improvement of division he/she shall have to offer the core courses only. In no

case he/she shall be allowed for improvement of division/grade/CGPA by offering General Interest Course.

8. The number of papers and marks allotted to each subject and the minimum marks which an examinee must obtained in order to pass the examination shall be as indicated in Appendices, appended with the Regulation.

9. The classification in reference to the class/division/grade to be awarded to the examinee shall be as per the Table-III (Equivalence to Class / Division to CGPA) of para No.IX, appended to the Regulation.

10. As soon as possible after the examination, but not later than 30th, June following, the B.O.E. shall publish a list of successful examinees arranged in Division as mentioned in Table-III (Equivalence to Class / Division to CGPA) of para No.IX, appended to the Regulation. The names of examinees passing the examination as a whole in the minimum prescribed period and obtaining the prescribed number of places in each subject in the division as per Table-III of the Regulation shall be arranged in order of merit as provided in the Examinations in General Ordinance No.6.

Sd/-

Amravati — (Dr.Kamal Singh)

Date : 21/6/2010 — Vice-Chancellor

*****

DIRECTION

No. :39/ 2011 — Date :23.8.2011

Subject : Corrigendum to Direction No. 26/2010

Whereas, the Direction No.26 of 2010 in respect of Scheme of Choice Based Credit System (CBCS) and awarding Grades to the Post Graduate students in the faculty of Science is in existence.

AND

Whereas, the Academic Council in its emergent meeting held on 28.5.2010 vide item No.36 has approved the decision regarding introduction of scheme for C.B.C.S. and Awarding grades to the P.G. students in the faculty of Science under Ordinance No.4 of 2008..

AND

Whereas, in sub-para V of para 3, under Direction No.26 of 2010, there shall be Programme Committee and the duties of the Programme Committee shall be to remove the difficulties if any faced during implementation of C.B.C.S. and report it to Hon'ble Vice-Chancellor for further action and any other matter as it think fit for the effective implementation of C.B.C.S.

AND

Whereas, the Programme Committee in its meetings held on 14.7.2011, 20.7.2011, 30.7.2011 & 9.8.2011 has recommended necessary corrections in the above Direction which will be effective from the academic session 2011-12. The minutes of the Programme Committee was accepted by Hon'ble Vice-Chancellor on dated 22.8.2011.

AND

Whereas, it is necessary to carry out the corrections in the above said Direction immediately.

Now, therefore, I, Dr.Mohan K.Khedkar, Vice Chancellor of Sant Gadge Baba Amravati University, in exercise of powers conferred upon me under sub-section (8) of section 14 of the Maharashtra Universities Act., 1994, do hereby direct as under:

1. This Direction may be called "Corrigendum to Direction No.26/2010.

2. This direction shall come into force from the date of its issuance.

3. (A) In Direction No.26/2010 in respect of Scheme of Choice Based Credit System (CBCS) and awarding Grades to the Post Graduate students in the faculty of Science following paras be corrected as follows :

i) In para II, sub para (i) of para 3 in the fifth line after the words ódess than ô the figure, sign, and words ó72 (52 core and elective)ôbe substituted by the figures, sign, and words ó88(64 core and elective)ô

ii) In para VI: the title ñDepartmental Committeeò be replaced as ñProgramme Monitoringò and Para 1 be completely deleted. Instead of this, the new para should be ñEvery P.G. programme of the University/College shall be monitored by the Head of the Department of the University/College of the concerned subject.ò

iii) The para VII shall be substituted as given below -

ñVII. Grievance Redressal

All the grievances regarding Internal Assessment shall be settled by H.O.D. or the teacher of the department nominated by H.O.D. / Principalò.

iv) In para IX : Table I: the grades in column No.2 shall be substituted as under -

"O	by	AA
A^+	by	AB
A	by	BB
B^+	by	BC
B	by	CC
C^+	by	CD
C	by	DD"

v) **In para X :**

i) In the first line the word óGradeô be added after the word óawardedô and before the word ópointsô.

ii) In third line the words óobtained in each subjectô be substituted by the words óobtained in Core and Elective courses of the subjectô

vi) **In para XI :**

- In sub para (i) in the first line the word ñHead of the Departmentô be inserted after the words & sign ñeach course,ò and before the words ñevery teacherò.
- The sentence ñNormally the teacher concerned may conduct three written sessional examinations spread periodically during the semester and select best two for contributing to the final marksò shall be deleted.
- Sub para (ii) & (iii) be deleted completely.

- Sub para (iv) be renumbered as sub para (ii) and the word ñteacherò in the second line of the original sub para (iv) be substituted by the words ñHead of Departmentsò.
- Sub para (v) be renumbered as sub para (iii). In original sub para (v) the words ñgrade points and gradesò be deleted.
- Sub para (vi) be deleted completely.

vii) The word óMinimumô printed below the table in Appendix A, B, C, D, G, and H, shall be deleted.

viii) Following special explanatory Note be added below the table in Appendix-D, H, L, and P respectively.

ñ**Special Explanatory Note** :- At the end of IVth semester, the students/examinee who accumulated atleast 88 credits (out of these 88 credits, 64 credits must be on core and elective course) and who has put in the minimum residence time shall be eligible to receive the degree in the subject he/she has admittedò.

(B) The students should have accumulated 28 credits of M.Sc. Part-I, Sem-I & II taken together for admission to III Semester and should have completed the term of M.Sc. Part-I (Semester-I & II) satisfactorily.

Sd/-

Amravati — (Mohan K.Khedkar)

Date : 22/8/2011 — Vice-Chancellor

*****

DIRECTION

No. : 25 / 2012 — Date : 29/6/2012

Subject : Corrigendum to Direction No.26/ 2010 and 39/2011

Whereas, the Direction No.26 of 2010 in respect of Scheme of Choice Based System (CBCS) and awarding Grades to the Post Graduate Students in the faculty of Science is in existence.

AND

Whereas, University has issued corrigendum to Direction No.26 of 2010 vide Direction No.39 of 2011 on dated 23.8.2011.

AND

Whereas, in sub-para V of para 3, under Direction No.26 of 2010, there shall be Programme Committee and the duties of the Programme Committee shall be to remove the difficulties if any faced during implementation of C.B.C.S. and report it to Hon'ble Vice-Chancellor for further action and any other matter as it think fit for the effective implementation of C.B.C.S.

AND

Whereas, the Programme Committee in its meeting held on 1st March, 2012 and 18th April 2012 has recommended necessary corrections in the above said Directions which shall be effective for 2011-12 session and the minutes of the Programme Committee was accepted by the Hon'ble Vice-Chancellor.

AND

Whereas, the Academic Council in its meeting held on 13.1.2012, vide item No.14(5) F) R-3, I) R-2 & R6 has accepted additional eligibility criteria for Admission to M.Sc. (Zoology), Direct admission to M.Sc. Part-II (Computer Science) for the students who have passed the degree of M.Sc. (Computer Software), and revised syllabi of M.Sc. (Computer Science), which is to be implemented from the Academic Session 2012-13.

AND

Whereas, it is necessary for carryout the corrections in the above said Direction immediately.

Now, therefore, I, Dr.Mohan K.Khedkar, Vice Chancellor of Sant Gadge Baba Amravati University, in exercise of powers conferred upon me under sub-section (8) of section 14 of the Maharashtra Universities Act., 1994, do hereby direct as under:

1. This Direction may be called ñ Corrigendum to Direction No.26/2010 and 39/2011ò.
2. This direction shall come into force from the date of its issuance.
3. In Direction No.26/2010 in respect of Scheme of Choice Based System (CBCS) and awarding Grades to the Post Graduate Students in the faculty of Science, following corrections shall be carried out-

A) i) In para 5th , the words and brackets ñDegree of विज्ञान स्नातक (Bachelor of Science)ò shall be substituted as ñDegree of विज्ञान पारंगत (Master of Science)ò

ii) The clause (i), of sub-para (II) of para 3 shall be deleted.

iii) The clause (i), of sub-para (II) of para 3 shall be renumbered as para (ñiò) and new para (ii) shall be added as follows.

ñMinimum total credits that students shall have to accumulate in all four semesters for receiving the M.Sc. degree core subject shall be as shown in the table given as under ï

Subject/s	Minimum total credits (Core Elective and GIC)
All subjects other than Mathematics, Computer Science & Biotechnology	104
Computer Science	119
Biotechnology	150
Mathematics	100

B) i) Under Table-III (Equivalence of Class/Division of CGPA) of Para IX,

(a) the figures shown ó7.49ô, ó5.99ô, and ó5.49ô against Sr.Nos.3, 4 & 5 in Column No.2 (CGPA) be substituted by the figures ó7.50ô, ó6.00ô, and ó5.50ôrespectively.

(b) Following sub-para be added before the para óXô.

ñ**Declearation of Merit List** :- Merit list of M.Sc. (C.B.C.S.) examination shall be prepared from the examinee who have successively cleared minimum total credits including GIC as shown in the table assigned in the first attempt.

ii) Special Explanatory note shown under Appendix-D, H, I, L and P shall be deleted.

The note No.(2) printed under Appendix-A, B, C, D, E, F & H shall be substituted as follows-

ñIf the student has not scored minimum marks or minimum grade points mentioned in column No. 8 and if the student scores minimum marks or minimum grade points in either theory or internal assessment then he/she will be declared to have cleared either of the headò.

4. In Direction No.39 of 2011, under para IX), in Table-I & II, under column No.2, i.e. ñGrade Pointsò and ñFinal Gradeò shall be substituted respectively as under.

ñO	by	AA
A+	by	AB
A	by	BB
B+	by	BC
B	by	CC
C+	by	CD
C	by	DDò

5. As the revised syllabi has been accepted by the Academic Council, for the subject Computer Science of four theory papers to each semester therefore the Scheme of Examination for M.Sc. Semester-I to IV shall be as per Appendices-A, B, C & D appended to Direction No.26 of 2010, which is to be implemented for Semester-I from Winter-2012, Semester-II from Summer-2013, Semester-III from Winter-2013 & Semester-IV from Summer-2014 respectively.
6. The students passing B.Sc. Agriculture with specialization Antomology and Fisheries shall be eligible for admission to M.Sc. Zoology with specialization Antomology and Fisheries respectively.
7. The student having Degree of M.Sc. (Computer Software) shall be eligible for directly admission to M.Sc. Part II (Semester III) (Computer Science) in the faculty of science within the jurisdiction of sant Gadge Baba Amravati University, Amravati. The average percentage of Marks of M.Sc. (Computer software) and percentage of marks of M.Sc. (Computer Science) shall be considered to award class / Grade for awarding the degree of M.Sc. (Computer Science).

Sd/-

Amravati — (Mohan K.Khedkar)

Date : 28/6/2012 — Vice-Chancellor

*****

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI

DIRECTION

No. : 7 of 2014 Date: 07/05/2014

Subject : Corrigendum to Direction No.25 of 2012

Whereas, Direction No.25 of 2012 in respect of Corrigendum to Direction No.26/2010 and 39/2011 in the Faculty of Science is in existence in the University.

AND

Whereas, the Academic Council in its meeting held on 17.2.2014 vide item No.22 2) E) R-2 while considering the recommendations of Faculty of Science has approved the recommendation regarding award of M.Sc. (Computer Science) degree.

AND

Whereas, the matter is required to be regulated by framing the Ordinance and making of an Ordinance may likely to take some time.

AND

Whereas, the changes are to be made applicable from the Academic Session 2014-15.

Now, therefore, I, Dr.J.A.Tidke, Vice-Chancellor of Sant Gadge Baba Amravati University, Amravati in exercise of powers conferred upon me under sub-section (8) of section 14 of the Maharashtra Universities Act, 1994, do hereby direct as under:

1) This Direction may be called, ñCorrigendum to Direction No.25 of 2012, Direction, 2014ò
2) This Direction shall come into force w.e.f. the date of its issuance.
3) In Direction No.25 of 2012, in Para 7., the lines ñThe average percentage of Marks of M.Sc. (Computer software) and percentage of marks of M.Sc. (Computer Science) shall be considered to award class / Grade for awarding the degree of M.Sc. (Computer Science)ò be substituted by the lines ñ**The class / Grade for awarding the degree of M.Sc. (Computer Science) shall be awarded on the basis of performance at M.Sc. Part-II (Computer Science) onl**y.

Date : 3/5/2014

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI

DIRECTION

No. : 8 of 2014 Date : 07/05/2014

Subject : Corrigendum to Direction No. 14 of 2009 in respect of Examinations leading to the Degree of विज्ञान पारंगत (Master of Science) (Four Semester Degree Course).

Whereas, Ordinance No.4/2008 in respect of Examinations leading to the Degree of विज्ञान पारंगत (Master of Science) (Four Semester Degree Course), Ordinance, 2008, in the Faculty of Science is in existence in the University.

AND

Whereas, Direction No. 14 of 2009 in respect of Examinations leading to the Degree of विज्ञान पारंगत (Master of Science) (Four Semester Degree Course) in the Faculty of Science is in existence in the University.

AND

Whereas, the Academic Council in its meeting held on 17.2.2014 vide item No.22 2) E) R-1 while considering the recommendations of Faculty of Science has approved the B.C.A. degree holders of this University are eligible for admission to M.Sc. (Computer Software) course.

AND

Whereas, the matter is required to be regulated by framing the Ordinance and making of an Ordinance may likely to take some time.

AND

Whereas, the changes are to be made applicable from the Academic Session 2014-15.

Now, therefore, I, Dr.J.A.Tidke, Vice-Chancellor of Sant Gadge Baba Amravati University, Amravati in exercise of powers conferred upon me under sub-section (8) of section 14 of the Maharashtra Universities Act, 1994, do hereby direct as under:

1) This Direction may be called, ñCorrigendum to Direction No. 14 of 2009 in respect of Examinations leading to the Degree of विज्ञान पारंगत (Master of Science) (Four Semester Degree Course) Direction 2014.ò

2) This Direction shall come into force w.e.f. the date of its issuance.

Sd/-
(Dr.J.A.Tidke)
Vice-Chancellor
Sant Gadge Baba Amravati University

3) In Direction No. 14 of 2009 in respect of Examinations leading to the Degree of विज्ञान पारंगत (Master of Science) (Four Semester Degree Course), in para 3., after the lines ñA person who has passed the Degree of Bachelor of Science with Post Graduate Diploma in Computer Science of this University OR ñ following lines be inserted

ñThe Candidates having B.C.A. degree of this University shall be eligible to take admission to M.Sc. Part-I (Computer Software) course OR ñ

Date : 3/5/2014

Sd/-
(Dr.J.A.Tidke)
Vice-Chancellor
Sant Gadge Baba Amravati University

SYLLABUS PRESCRIBED
FOR M.SC.(COMPUTER SOFTWARE)

SEMESTER - I

PAPER I:-DESIGN AND ANALYSIS OF ALGORITHM

Unit I : Divide and Conquer: General Method, Binary Search, Finding the maximum and minimum, Merger Sort, Quick Sort, Selection sort, strassenôs matrix multiplication.

Unit II : Greedy Methods, Optimal storage, Knapsack Problem, Job sequencing with deadline, Optimal merge patterns, minimum spanning trees, single source shortest path algorithm.

Unit III : Dynamic Programming: General Method, multistage graphs, all pair shortest paths, Optimal Binary search trees, 0/1 Knapsack. Reliability design. Traveling salesman problem. Flow shop scheduling.

Unit IV : Basic search and traversal techniques:

General Method, Code Optimization, AND/OR graph, Game trees , Bi-connected Components, Depth first search technique.

Unit V : Backtracking: General Method, the 8- Queens problem, Sum of subsets. Graph Coloring, Hamiltonian Cycles, Knapsack problem.

Branch and Bound Techniques: General Method, 0/1 Knapsack Problem, Traveling salesperson problem, Efficiency Considerations.

Books :

1. E. Horowitz & S. Sahani : Fundamentals of Computer Algorithm, (Golgotia)
2. Aho & Ullman : Analysis and Design of Algorithm (Addison- Wesley)
3. Hopcroft : Analysis of Algorithm (Addison- Wesley)
4. D. Knuth : The art of Computer Programming Vol I,II,III (Narosa Publishing)
5. Corman : Design and Analysis of Algorithm (PHI)
6. Aho : data tructure & Algorithm (Addison- Wesley)

Paper II:-Operating System

Unit I : General Overview of UNIX system kernel , Architecture of Unix / Linux OS, Kernel data structure, System administration, Buffer cache : Operation, advantages and disadvantages.

Unit II : Internal representation of files, I nodes structure, Directories, super block , allocation of disk blocks, System call related to file system in Unix.

Process: Concept & states of process, Transition of process states , Layout of system memory. Context switch, process control, process scheduling and timing.

Unit III : Main memory management : Memory management policies in Unix, Swapping, paging and demand paging. Hybrid system, I/O subsystem: Drives, streams and I/O subsystem management in Unix.

Unit IV : Inter process communication & Synchronization, Process tracing system, IPC , Network Communication, remote procedure calls , Sockets: Concepts, Programming and implementation in Unix.

Unit V : Multiprocessor system: Problems and solutions with Master / Slave processors, Concept of client/server computing, and the role of an Operating System in such environments. Distributed Unix OS.

Books :

1. Bach M.J. ï Design of Unix Operating System (PHI)
2. Crowley ï Operating Systems : A Design-Oriented Approach (TMH)
3. Taneubum A.S. - Operating System : Design & Implementation (PHI)
4. Linux Linleashed (Techmedia)
5. Corner. D. Operating System Design (Prentice-Hall)
6. Back ï Linux Kernel Internals (Addison ï Wesley)

PAPER III :- .NET TECHNOLOGIES - I

Unit I : **ASP.Net:** Introduction ,.Net frame works, Web Forms, Server controls, Server control events, User controls, Web Namespace, Master detailed relationship. State management, validation, Web application security, Mobile framework, Transaction management, Building .Net components, Web Services , Enterprise services. The Session state object, session variable, session state, ASP.Net session state, Associating data.

Unit II : Debugging and Error Handling, Using Debugger, Event sequence, File and event log access with ASP.Net, Writing files, creating files and directories, Sending and receiving files, Accessing windows Registry, Sending and receiving Messages, Types of messages.

Unit III : **VB.Net:** Application Vs Web sites, Creating configuration files, State maintenance options, Cache object, Caching

ASP.net Pages, controlling access and monitoring, SSL, Tracking usage, advanced page count. Planning applications, Design methodology, plan the user interface, data storage and retrieval, creating database and data access components.

Unit IV : Advance VB.Net Web applications, Client / Server side script, DOM, Accessing the DOM from script, using ActiveX controls, Web services, Remote method call and XML, Interoperate across application / platform, Web Service Description Language, Consume a Web service, SOAP(Simple Object access Protocol) , Finding Web services.

Unit V : Web Services , COM components, Microsoft SOAP toolkit, Creating client application, building ActiveX DLL, User controls, custom server control, customizing toolkit, Transforming data between web form and component, Efficiency and scalability.

Books :

1. A Russell Jones : ASP.Net with VB.Net. (BPB Publication)
2. Jeffery R. Shapiro : The Complete Reference Visual Basic . Net (TMH)
3. Sams Tech : Teach Yourself VB.Net in 21 Days.
4. VB.Net How to Program : Harvey M. Deitel, P,J. Deitel.
5. An Introduction to Object Oriented Programming with VB.Net : Dan Clark
6. Quest : VB.Net Programming: Y.P. Kanetkar.

PAPER IV :-DATA COMMUNICATION AND NETWORKING

Unit I : Introduction : Definition and use of data Communication, components of communication network, future trends in communication and networking, Network application, Voice communication network. Switches, PBX, cellular technology, FAX machines, special purpose devices. Data communication network architecture, Hosts, Clients Circuit, special purpose communication devices

Unit II : Digital transmission of digital data, Analog transmission of digital data, Modems, Digital transmission of analog data. Data Link Layer: OSI model, media access control, Error control in network, Data link protocols, Transmission efficiency. Network Layer: Network topologies, network routing, network standards, Network protocols, TCP/IP, IPX/SPX, X.25, GOSIP, SNA.

Unit III : LAN: Types, Components of Lan, Ethernet, Token Ring, MAP, Arcnet, Apple talk, Selecting and performance improvement of LAN. LAN/MAN: Types of communication services, Dialed, dedicated & switched circuit services. Packet switched network.

Unit IV : Back Bone networks: Components, Fast Ethernet, FDDI, switched network, Performance improvement, Network design and implementation steps: Feasibility study, Design plan, Information needs, Defining, new network requirements, Geographic scope, Circuit requirements, Network security & control Configuration, costs & implementation.

Unit V : Network management: Functions, Configuration management, performance & fault management, End user support, cost management. Tools, Network Security: Needs, threats, Risk Assessment, Controlling destruction & disaster, unauthorized Access.

Books:

1. J, Fitzgerald & A. Dennis ï Bisiness Data Communication & Networking (5/e)(Wiley)
2. Tenanbarry A.S. ï Computer Network (PHI)
3. Stalling W. ï Data & Computer Communication (PHI)
4. Milless : Analog & Digital Data Communication (Jaico)
5. Sterens : TCP/IP illustrated (Addison ï Wesley)
6. Beyda: Data Communication (Addison ï Wesley)

SYLLABUS PRESCRIBED

FOR M.SC.(COMPUTER SOFTWARE)

SEMESTER - II

PAPER V: ELECTRONIC COMMERCE

Unit I : Introduction: Basic web commerce concept, e-commerce environment, virtual corporation, Applications, Benefits, Element & security of Web commerce. Electronic market place technologies. Modes of e-commerce. EDI, pen EDI, e-commerce with www/Internet. Safe E-commerce: Secure transport protocols, S-HTTP, SSL & alternative, secure transaction (SET), Host security considerations, Enterprise network security.

Unit II : E-Cash & E-payment systems: internet monetary payment and security requirements, confidentiality, integrity, authentication, inter operatability payment and purchase order process. On-line electronic cash: overview, problem,

issues, implementation & e-cash inter operatability. Electronic payment schemes.

Unit III : Security: need for computer security, specific intruders approaches, security strategies, security tools, Encryption methods, Enterprise networking & internet access, Antivirus program, security teams.

Unit IV : Master Card/Visa card Processing: Introduction, Business requirements, Payment system participants, cryptography, certificate issuance, kinds of shopping, payment processing, cardholder/merchant registration, purchase request, payment authorization & capture.

Unit V : E-mail & Secure E-mail: A model for massage handling, working of e-mails. MIME: Basic concept, parts, data encoding technique, address directory. S/MIME.MOSS. Comparisons of security methods. MIME & related facilities over the internet.

Books:

1. Mindi & Minoli Web Commerce Technology Handbook (TMH)
2. Kakakota & Whinston Frontiers of Electronic Commerce (Addison ï Wesley)
3. Kakakota & Whinston Frontiers of Electronic Commerce (Addison ï Wesley) Electronic Commerce (Jaico)
4. Kamlesh K. Bajaj & DNag, E-Commerce, the cutting edge (TMH) of Nusiness.
5. Understanding Electronic Commerce ï David Kansiur (Misor of press)

Paper VI: Core Java

Unit-I : Fundamentals : History & features of Java. Overview of Java : OOP, Applications of Applets. Lexical Issues, Keywords, class Libraries. Data Types, Variables & Arrays, Various types of operations in Java. Control statements.

Class fundamentals, declaring objects, introducing methods, construction, this keyword, garbage collection, finalize () method. Method overloading. Objects as parameters. Access control, Nested & inner classes. String class, command-line arguments.

Unit II : Inheritance basics, Using super, Multilevel hierarchy, Method overriding. Dynamic method dispatch, Abstract classes, Final keyword, object class. Packages, class path, access protection, importing packages, interfaces & their usage.

Unit III : Exception-handling fundamentals, type, using & catch blocks. Javasõ built in exceptions, using exceptions, Multithreading, Thread model, Main thread, Creating a thread ; various approaches. Thread priorities, Thread Synchronization, Inter thread communication.

Unit IV : I/O basics, streams, reading & writing to console, Printwrites class. Reading/writing files. Apple fundamentals & programming. The transient & volatile modifiers. Applet class, architecture & skeleton. Applet display methods, status window, HTML APPLET tag. Parameter passing.

Unit-V : Event Handling : Event delegation model, Event classes, Event Listener interfaces, Using event delegation model, Adopter classes, AWT classes. Window fundamentals. Frame Windows; AWT controls : Labels, button, check boxes, choice, lists, scrollbars, Text Field, Text Area. Layout Managers, Menu Bar & Menus. Dialog Boxes, File Dialog.

Books :

1. P.Navghtan & H.Schildt : Java 2 complete Reference (3/e) (TMH)
2: Java 2 Unleashed (3/e) (Techmedia)
3. Webev : Using Java 2 Platform (PHI)
4. Sankar : Java 2 Class Libraries Unleahed (Techmedia)
5. Timothy Budd : Understanding object oriented
6. Arnoid : The Java Programming Language (Addison-Wesley)

PAPER VII: RDBMS

Unit I : Introduction: Data base systems & the evolution of database technology. File oriented systems, data base systems, client/ server systems. Database systems in the organizations. Conceptual database design, data models, objects, Aggregation, Generalization. Relational Data model: Fundamental concepts,

Unit II : Normalization process, 1NF, 2NF, 3NF, 4NF, BCNF transforming a conceptual model to a Relational model. Relational Algebra; Relational calculus, Relational implementation with SQL: overview, schema & table definition, data manipulation, view definition, Information schema.

Unit III : Client/Server Databases: Introduction, defining database tables on server DBMS. Server data manipulation & programming. Developing client applications. Visual Basics approach to client application. Creating queries in VB. VB data control & DAO.

Unit IV : Physical data base system: Storage media, disk performance factors, data storage formats on disk, file organization & Access methods. Implementing logical relationships, balanced-tree indexing, Query optimization.

Unit V : DB Administration: overview, DBA functions, goals, Database integrity, database systems: General DDS model, Design issues, data integrity in DDS. Database Recovery in DDS.

Books:

1. Raghu Ramkrishna ï Database Management System (McGrawHill)
2. Hansen & Hansen ï Database Management & Design(PHI)
3. Korth & Silbershatz ï Database Management & system (McGrawHill)
4. C.J. Date - Database Management system (Addison ï Weley)

PAPER VIII: FREE OPEN SOURCE SOFTWARE

Unit I : Overview of Free/Open Source Softwareð Definition of FOSS & GNU, History of GNU/Linux and the Free Software Movement , Advantages of Free Software and GNU/Linux, FOSS usage , trends and potentialð global and Indian.GNU/ Linux OS installationð detect hardware, configure disk partitions & file systems and install a GNU/Linux distribution ; Basic shell commands - logging in, listing files, editing files, copying/moving files, viewing file contents, changing file modes and permissions, process management ; User and group management, file ownerships and permissions, PAM authentication ;

Introduction to common system configuration files & log files ; Configuring networking, basics of

TCP/IP networking and routing, connecting to the Internet (through dialup, DSL, Ethernet, leased line).

Unit-II : Configuring additional hardware - sound cards, displays & display cards, network cards, modems, USB drives, CD writers ; Understanding the OS boot up process ; Performing every day tasks using gnu/Linux ð accessing the Internet, playing music, editing documents and spreadsheets, sending and receiving email, copy files from disks and over the network, playing games, writing CDs ; X Window system configuration and utilities ð configure X windows, detect display devices ; Installing software ð from source code as well as using binary packages. Setting up email serversð using postfix (SMTP services), courier (IMAP & POP3

services), squirrel mail (web mail services) ; Setting up web servers ð using apache (HTTP services), php (server-side scripting), perl (CGI support) ; Setting up file services ð using samba (file and authentication services for windows networks), using NFS (file services for gnu/Linux / Unix networks) ; Setting up proxy services ð using squid (http / ftp / https proxy services) ; Setting up printer services - using CUPS (print spooler), foomatic (printer database)

Unit-III : Setting up a firewall - Using netfilter and ip tables; Using the GNU Compiler Collection ð GNU compiler tools ; the C preprocessor (cpp), the C compiler (gcc) and the C++ compiler (g++), assembler (gas) ; Understanding build systems ð constructing make files and using make, using autoconf and autogen to automatically generate make files tailored for different development environments ; Using source code versioning and management tools ð using CVS to manage source code revisions, patch & diff.

Unit-IV : Understanding the GNU Libc libraries and linker ð linking against object archives (.a libraries) and dynamic shared object libraries (.so libraries), generating statically linked binaries and libraries, generating dynamically linked libraries ; Using the GNU debugging tools ð gdb to debug programs, graphical debuggers like ddd, memory debugging / profiling libraries mpatrol and valgrind ; Review of common programming practicies and guidelines for GNU/Linux and FOSS ; Introduction to Bash, sed & awk scripting. Basics of the X Windows server architecture.

Unit-V : Qt Programming ; Gtk+ Programming ; Python Programming ; Programming GUI applications with localisation support.

REFERENCES

Text Book :

1. *Introduction to Linux: Installation and Programming* N. B. Venkateshwarlu (Ed); B S Publishers; 2005. (An NRCFOSS Publication)

Reference Books :

2. *Running Linux*, Fourth Edition, Matt Welsh, Matthias Kalle Dalheimer, Terry Dawson, and Lar Kaufman, OðReilly Publishers, December 2002, ISBN: 0-596-00272-6.
3. *Linux Cookbook*, First Edition, Carla Schroder, OðReilly Cookbooks Series, November 2004, ISBN: 0-596-00640-3.

On-line materials

1. *Open Sources: Voices from the Open Source Revolution*, First Edition, January 1999, ISBN: 1-56592-582-3. URL: http://www.oreilly.com/catalog/opensources/book/toc.html
2. *The Linux Cookbook: Tips and Techniques for Everyday Use,* First Edition, Michael Stutz, 2001. URL: http://dsl.org/cookbook/cookbook_toc.html
3. *The Linux System Administrators' Guide,* Lars Wirzenius, Joanna Oja, Stephen Stafford, and Alex Weeks, December 2003. URL: http://www.tldp.org/guides.html
4. *Using GCC*, Richard Stallman et al. URL: http://www.gnu.org/doc/using.html
5. *An Introduction to GCC*, Brian Gough. URL: http://www.network-theory.co.uk/docs/gccintro/
6. *GNU Autoconf, Automake and Libtool,* Gary V. Vaughan, Ben Elliston, Tom Tromey and Ian Lance Taylor. URL: http://sources.redhat.com/autobook/
7. *Open Source Development with CVS*, Third Edition, Karl Fogel and Moshe Bar. URL: http://cvsbook.red-bean.com/
8. *Advanced Bash Scripting Guide,* Mendel Cooper, June 2005. URL: http://www.tldp.org/guides.html
9. *GTK+/GNOME Application Development,* Havoc Pennington. URL: http://developer.gnome.org/doc/GGAD/
10. *Python Tutorial*, Guido van Rossum, Fred L. Drake, Jr., Editor. URL: http://www.python.org/doc/current/tut/tut.html

SYLLABUS PRESCRIBED FOR M.SC.(COMPUTER SOFTWARE)

SEMESTER - III

PAPER IX: SOFTWARE ENGINEERING

Unit I : Evolution role of software. Software crises & myths. Software engineering. Software process & process models: Linear Sequential, prototype, RAD, Evolutionary, Product & process. Project Management concepts: People, Product, Process, Project. WSHH principle, Critical practices. Measures, merits & indicators. Metrics in process & project domains ï Software measurement, metrics for software quality, small organization.

Unit II : Software project planning: scope, resources, estimation, decomposition technique, Tools. Software risks: identification, risk: identification, risk projection, refinement & RMMM plan. Project scheduling: Concepts, people

Efforts, Task set, Task network, Scheduling. EV analysis, Project Plan. Software quality concepts. SQ Assurance, software reviews, technical reviews, software reliability, ISo gool, SQA plan.

Unit III : SCM process. Version control: SCM standards.System engineering: Hierarchy, Business Process & Product engineering: Overviews. Requirment engineering, system modeling, Requirement analysis. Analysis principle, software prototyping, Specification.

Unit IV : Design process. Design principle & concepts. Effective modular design. Design model & documentation.Software architecture, Data Design, Architectural styles, equirment mapping, Transforms & Transaction mappings. User interface design: Golden Rule, UID, Task analysis & modeling, ID activities, Tools design evolution. Component level design: Structured programming, comparison of design notation.

Unit V : Software testing fundamentals, test care design, whitebox testing. Basis pathcontrol structure, Black box - Testing & for specialized environments. Strategic approach to S/W testing. Unit testing, integration testing, Validation testing, system testing, Debugging. Technical metrics for software.

Text Book:

1. Pressman Roger S. S/W Engineering, A Practioner's approach (S/E) TMH.
2. Sommerville, Software Engineering (Addition-Wesley) (S/E)
3. Fairly R. Software Engineering (Mc Graw Hill)
4. Davis A Principle of Software Development (Mc Graw Hill)
5. Shooman, M.L., Software Engineering (Mc. Graw Hill)
6. Desikan, Ramesh : Software testing Principles and Practices (PE)

PAPER X: ADVANCED JAVA

Unit I : Applet and AWT tools, Windows fundamentals, working with various controls, Layout managers, Image controls, Working with events, Interfaces & event listeners.

Unit II : **Packages:** API Packages, Reflection, Remote method invocation, Stand alone applications ,Client /Server application using RMI., Socket programming.

Unit III : **Java Beans**: Bean development kit, JAR Files, creating Bean, Properties of bean, BeanInfo Interface, Java Bean API. Multithreading, priority of a thread, changing the priority.

Unit IV : **Swing:** JApplet, Icons & Labels, text fields, buttons, combo boxes, Tabbed Panes, Scroll Panes, Trees , tables, Exploring Swing.

Unit V : **Servelets:** Life cycle of a servelet, JSDK, Servelet API, Servelet Package, Classes and interfaces in servelets, Servelet parameters, reading and initializing servelets, HTTP, Request/ Response.

Books :

1. P. Navghatan & H. Schildt :Java2 Complete Reference(TMH)
2. Java 2 Unlished (Techmedia)
3. Dietel & Dietel : Java 2

PAPER XI: .NET TECHNOLOGIES II

Unit I : Introduction , .Net Framework, common language runtime, class library, general purpose languages, Domain specific languages, Working in groups, Common language runtime, common type system, common language specification, MSIL, metadata.

Unit II : C# : Introduction, Types, variables, Expressions, Operators, Boxing and unboxing, Type declaration, Input from console, Printing and formatting the output, interactive I/O, CLR, Command line arguments, controls and statements : Decision making, Iteration , branching statements.

Unit III : Classes, Objects, Objects as data types, static methods, class members, Controlling access, implementing class, Methods, Overloading methods, implementing methods, Abstract and base classes, virtual methods.

Unit IV : Structs and enum, arrays, strings, attributes, Exception and error handling, Common Exception classes, Exception handing routine. Data handling , ADO, Accessing and using Data in ADO, data set and commands.

Unit V : Printing in C#, Print preview , List View, automatic memory management, Garbage collection, algorithms for garbage collection, Finalization, Resurrection , Clean up , forcing an object clean up

Books :

1. Er. V.K.Jain : The Complete guide to C# Programming (Dreamtech Press)
2. Eric Gunnerson : A Programmers introduction to C# (APress)
3. Y.P. Kanetkar : C# .Net Fundas

4. Y.P. Kanetkar : Teach your self C# .Net Part ï I
5. Y.P. Kanetkar : Teach your self C# .Net Part ï II

PAPER XII:NETWORK SECURITY

Unit I : Introduction to network security, passive and active attacks, authentication, integrity, access control, The model of internet work security, internet standards : the internet society and RFC publications (Request for comments.)

Unit II : Cryptography : Encryption principles and various algorithms, standardization process, key distribution, public key cryptography and message authentication, digital signature. Network security applications : Kerberos, X.509 directory authentication services, e-mail security PGP (Pretty Good Privacy) operational description. MIME (Multipurpose Internet Mail Extensions), S MIME (Security/Multipurpose internet mail extensions) functionality.

Unit III : IP Security : Overview, IP security architecture, Authentication header, Web Security : Web security requirements, secure socket layer SSL, Transport layer security TLS, Secure Electronic transactions TES.Network.

Unit IV : Management Security : Basic concepts of SNMP, Network management architecture and protocol architectures, proxies, services, SNMPv1 authentication service, access policy and proxy service, SNMPv2 architecture, message processing and user security model, view based access control.System

Unit V : Security : Intruders, Intrusion technologies, password protection, password selection strategies, Intrusion detection, viruses and related threats : Nature of viruses, types, micro viruses and various antivirus approaches. Firewall : Characteristics, types of fire walls, Firewall configuration, Trusted systems, data access control, the concept of the trusted systems.

Books :

1. Network Security Essentials - William Stallings (Pearson Edu. Asia)
2. Network Security : Kaufman, Perlman, speciner(PE)
3. Network Security : Ahkit Fadia (M)
4. Network Security essential by stallings - pearson
5. Cryptography & Network Security by stallings ï pearson.

SYLLABUS PRESCRIBED
FOR M.SC.(COMPUTER SOFTWARE)
SEMESTER - IV
PAPER XIII:ARTIFICIAL INTELLIGENCE

Unit I : Introduction to Artificial Intelligence : Overview of Artificial Intelligence. Knowledge : General concept, Introduction to LISP : Syntax and numerical functions. Basic list manipulation function in LISP. Functions, predicates and conditional Input, output and local variables, iteration and recursion. Property list and arrays.

Unit II : Knowledge representation - I: Syntax and symantics for propositional logic. Syntax and symantics for FOPL. Properties of Wffs. Conversion to clausal form. Inference fuels. The resolution principle, Nondeductive inference methods. Representation using rules.

Unit III : Knowledge representation - II: Truth maintenance system. Default reasoning and closed world assumption. Predicate completion and circumscription, model and temporal logics. Overview of object oriented systems, object classes messages and methods, simulation examples using OOS program.

Unit IV : Knowledge organization and manipulation: Preliminary concept, Examples of search problems, Uniformed and blind search. Informed search. Searching AND-OR graphs, structure used in matching. Measures for matching: distance matrices, qualitative measures, similarity measures. Partial matching, Indexing and retrieval technique, Integrating knowledge in memory. Memory organization system.

Unit V : Knowledge Acquisition : General concept in knowledge acquisition, Learning by induction. Analogical and explanation based learning : Analogical learning and reasoning, Explanation and learning. Expert system : Expert system architectures : Introduction, Rules based system architecture. Nonproductive system architecture, Dealing with uncertainty. Knowledge acquisition and validation. Knowledge system building tools.

Books :

1. Artificial Intelligence by Elaine Rich, Mcgrawhill Inc.
2. Artificial Intelligence and Expert Systems- Jankiraman, Sarukesi (M)
3. Expert System : Theory and Practice ï Ermine(PHI)
4. Turbo prolog ï Nath(GP)

5. List Programming ï Rajeo Sangal ï (TMH)
6. Rule Based Expert System ï M. Sasikumar (Narosa)
7. Artificial Intelligence ï Russel ï Pearson ï 1st Text Book
8. Prolog : Prog. For A.I. by Bratko ï Pearson
9. Int. to Expert syst ï Jackson ï Pearson
10. Principles of AI ï Nils Nilson
11. A.I. by R.J. Winston ï Pearson
12. Prolog Programming and application ï Burnhan & Hall
13. ES: Theory and Practice ï Ermine ï PHI
14. Artificial Intelligence and Intelligent system by N.P.Padhy.

PAPER XIV: WEB SERVER ADMINISTRATION

Unit I : Communication Architecture of web, Functions of a Webserver. Planning for Microsoft IIS Architecture & Services. Windows NT and IIS. Internet Connectivity Architecture.

Unit II : IIS installation, Examining the components, Installing & using FTP services : FTP overview, Clients & Users, Virtual Servers, Directories.Installing & using Mail Services: SMPT protocol, procedures, Configuring Internet mail Server. Installing & using News server components, configuring the News Server. Broadcasting with Netshow.

Unit III : ISAPI Architecture, Applications, Filters & DLL. Index Server Overview: Architecture, Using Index Server, CRS. IIS Administration: Logging IIS activity & Reading. Reports.

Unit IV : Server side Loading, TCP/IP troubleshooting utilities: Microsoft site server. Allowing dynamic user Access Firewails & Internet Security. Secure transaction with IIS.Web site maintenance & Promotion Organizing & Assigning maintenance task. Hyperlinks verification. Promoting the site. Search engine listing, E-mail publicity, Banner Ads.

Unit V : Apache Server : Introduction, Installing Apache, Configuring Apache, starting , restarting and stopping, Advance administration , hosting multiple sites , Proxy server and caching , logs and monitoring , security, dynamic content , performance tuning, URL reviewing , Module construction .

Books:

1. Nelson Howell Using IIS4 Que (EEE)
2. (TMH) IIS Complete Reference Menller & Sheldon.

3. Microsoft internet information server tool kit / Resource kit. (Microsoft Press)
4. Mastering FrontPage 2000 (Techmedia)
5. Scott Hawkins : APACHE web server administration & E-commerce Handbook (PE)

PAPER XV: DATA MINING AND WAREHOUSING

Unit I : Introduction, Data mining, Data mining functions, classification and major issues. Data Preprocessing : Data cleaning, data integration and transformation, data reduction, discretisation concept hierarchy generation.

Unit II : Data mining primitives: Data mining primitives, data mining query language. Concept description: concept description, data generalization, Analytical characterization, mining class comparison.

Unit III : Application and trends in data mining: data mining applications, data mining systems and research Prototypes, additional themes on data mining, trends in data mining, Data Mining tools: Architecture, Memory Based Reasoning, Automatic cluster detection, Neural Networks, Genetic Algorithms, Decision Trees.

Unit IV : Data ware house design: OLAP, MOLAP, ROLAP Technologies Data Staging: overview, plan effectively, dimension table staging, fact table loads and ware house operations, data quality and cleansing, miscellaneous Issues, Distributed data ware house, its architecture, types of database distribution.

Unit V : Building end user applications: role of end user application, application specification, end user application development, maintaining and growing data ware house: manage the existing data ware house environment, prepare for growth and evaluation, data ware house analysis, CUBE, ROLL UP and STAR queries.

Books :

1. J. Han and M.Kamber :Data Mining Concepts and Techniques, Elsevier Pub. Indian Reprint, 2004.
2. R. Kimball : The Data Ware House Life Cycle Tool Kit, Wiley Press, John Wiley and Sons (ASIA) Pvt. Ltd.
3. Berson : Data Ware Housing, Data Mining and OLAP, Tata McGraw Hill.

4. Arun K. Pujari : Data Mining Techniques, University Press (Orient Longman)
5. Michale Corey, Michale Abbey, Oracle 8i Data Warehousing; Tata McGraw Hill.
6. Navathe; Data Mining, Orient Longman, 2003

PAPER XVI: COMPUTING TECHNIQUES IN BIO INFORMATICS

Unit I : Introduction to Bioinformatics,its branches, applications, area of research. Introductory biology for bio informatics.Bio informatics data bases, its categories, type .retrieval system, sequence and Molecular file formats, prediction of Protein structure.

Unit II : Data bases in bioinformatics:-sequence data bases, Structure data bases, and other data bases. PDB, MMDB, CATH, FSSP, DALI, SCOP, MEROPS, BRENDA, CAZY, enzyme DATA BASES, NTSYS-pc, SOPMA, FASTA,BLAST.

Unit III : Tools in Bioinformatics:-Tools, its need, trends, Data submission sequence submission, protein submission, tools. Data analysis tools, Prediction tools, Modeling tools.

Unit IV : Algorithms in Bioinformatics:-, Biological, Bio informatics algorithms, analysis, Sequence comparison, substitution matrices, prediction, structure algorithms, unweighted pair group method for arithmetic averages(UPGMA).

Unit V : Modeling and simulation and statistical protocols., Monte Carlo methods Molecular dynamics simulation package.Commercial and Academic bio informatics software, its applications and PERL for bioinformatics.

BOOKS:-

1. BIO INFORMATICS data bases, Tools, Algorithm: Orpitra Bosu, & S.K.thakural ,Oxford University Press.
2. Bio informatics :Principle and applications.: Zhummur Ghosh & B.Mallick, Oxford University Press.
3. Introduction to Bioinformatics:Arther M.Lesk Oxford university Press
4. Introduction to Bioinformatics;AttwoodDavid J. etc Long man Pub.
5. Introduction to Bioinformatics algorithm:Jone,Pavel A.P etc,Anne pub.
6. Fundamental concepts of Bio informatics:Krane, Dan E, Pearson Pub.
7. Developing Bio informatics Computer Skill:Gibas,Cythia, shroff pub.

8. Bioinformatics, methods and applications: S.C Rastogi, N. Mendiratta, P. Rastogi. Tata MCgraw-Hill India.
9. Bioinformatics computing: Bergeron Bryan. Prentice-Hall of India Private Limited.
10. Bioinformatics, A Beginnerôs guide : Jean- Michel Claverie and Cedric Notredane. WILEY-dramtech India Pvt. Ltd.

Distribution of Practical
(Common for Each Semester & Practical)

Breakup of Marks :-

a) Lab. Practical :-

i)	Two Programme	30 Marks (15 Each)
ii)	Practical Record	05 Marks
iii)	Viva-Voce	05 Marks
iv)	Internal Assessment	10 Marks

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Total 50 Marks

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b) Project Work :

i)	Project Work and Presentation	30 Marks
ii)	Project Report	05 Marks
iii)	Project Viva-voce	05 Marks
iv)	Internal Assessment	10 Marks

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Total 50 Marks

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Each M.Sc.-II student is required to submit two copies of report at the time of examination. The project work will be evaluated by external and internal examiner.

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