

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY



CIRCULAR NO.SU./B.Sc.CBC & GS/11/2022

It is hereby inform to all concerned that, on the recommendation of Faculty of Science & Technology Meeting dated 24.08.2022, **the Academic Council at its meeting held on 29 August 2022 has accepted the following Syllabi of B.Sc. Degree under the Choice Based Credit & Grading System along with Rules and Regulation** as appended herewith:-

1.	B.Sc.Computer Science (Optional)	Ist and IInd semester
2.	B.Sc.Computer Application (Optional)	Ist and IInd semester
3.	B.Sc.Computer Application (Degree)	Ist and IInd semester
4.	B.Sc.Computer Science (Degree)	Ist and IInd semester
5.	B.Sc.Horticulture (Optional)	Ist to VIth semester
6.	B.Sc.Botany (Optional)	Ist to VIth semester
7.	B.Sc. Agrochemical & fertilizer (Optional)	Ist to VIth semester
8.	B.Sc.Home Science (Optional)	Ist and IInd semester
9.	B.Sc.Automobile Technology (Degree)	Ist and IInd semester
10.	B.Sc.Workshop Technology (Degree)	Ist and IInd semester
11.	B.Sc.Refrigeration and Air Conditioning (Degree)	Ist and IInd semester
12.	B.Sc.Environmental Science (Optional)	Ist and IInd semester
13.	B.Sc.Biotechnology (Degree)	Ist and IInd semester
14.	B.Sc.Biotechnology (Optional)	Ist and IInd semester
15.	B.Sc.Dairy Sci.& Tech (Optional)	Ist and IInd semester
16.	B.Sc.Zoology (Optional)	Ist to VIth semester
17.	B.Sc.Polymer Chemistry (Optional)	Ist and IInd semester
18.	B.Sc.Fisheries Science (Optional)	Ist and IInd semester
19.	B.Sc.Instrumentation Practice (Optional)	Ist semester
20.	B.Sc.Biochemistry (Optional)	Ist and IInd semester
21.	B.Sc.Non Conventional & Conventional Energy (Degree)	Ist and IInd semester

This is effective from the Academic Year 2022-23 and onwards.

All concerned are requested to note the contents of this circular and bring notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
Ref.No. SU/B.Sc./2022/ 8428-35
Date:-29.08.2022.

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**Deputy Registrar,
Academic Section**

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Copy forwarded with compliments to :-

- 1] **The Principal, concerned affiliated College,**
Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

- 1] The Director, Board of Examinations & Evaluation,
- 2] The Section Officer, [B.Sc. Unit] Examination Branch,
- 3] The Programmer [Computer Unit-1] Examinations,
- 4] The Programmer [Computer Unit-2] Examinations,
- 5] The In-charge, [E-Suvidha Kendra],
Rajarshi Shahu Maharaj Examination Branch,
- 6] The Public Relation Officer,
- 7] The Record Keeper,

JS*29082022/-

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad- 431004(MS) India**



**Undergraduate Bachelor Degree Program
in Science (B.Sc.)**

**BOTANY (Optional Subject)
Ist to VIth Semester**

**Course Structure and Curriculum
(Outcome Based Curriculum)**

Choice Based Credit & Grading System

(Effective from Academic Year 2022-23)

2022-2023


22/08/22

Effective from 2022 – 2023 for all affiliated Colleges



Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

B.Sc. Botany

Choice Based Credit & Grading System B.Sc. Botany syllabus was finalized in the meeting of Board of Studies held on 20-08-2022, effective from academic year 2022-23 for B.Sc. FY onwards. The following members were present:

- | | |
|--------------------------|--------------------|
| 1. Prof. Ravi P. Patil | BOS Chairman |
| | Advisory Committee |
| 2. Prof. Ashok M. Chavan | Member |
| 3. Prof. Arvind S. Dhabe | Member |
| 4. Prof. Anil Bhuktar | Member |

Chairman, BOS, Botany
Dr BAMU, Aurangabad

Head
UG & PG Dept of Botany
Deogiri College, Aurangabad,

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad- 431004(MS) India



Syllabus Designing Committee for Choice Based Credit & Grading System (B.Sc. Botany) constituted by Chairman, Board of Studies in Botany is given below:

BSc Ist and IInd Semester

Chairman: Dr. V. S. Sawant.

Members: Dr. Mukund P.Kulthe, Dr. V. D. Devarkar, Dr. S. N.Solunke, Dr Sunita Bhosle & Dr.T.A. Gitte

BSc IIIrd and IVth Semester

Chairman: Dr. Gulab Rathod.

Members: Dr.Umesh Mogle, Dr.Santosh Talekar, Dr.Anil Kshirsagar, Dr.Vishal Sarwade,& Dr.Mustafa Dandu

BSc Vth and VIth Semester

Chairman: Dr V. C. Khilare.

Members: Dr. U. N. Bhale, Dr. U. S. Salve, Dr Smita Basole, Dr A.S.Taware, Dr Asfaque Khan, Dr. S. T.Bandewar, Dr M.A. Kare, Dr. Datta Ghogare, Mrs Archana Mukhedkar & Dr. Sachin Chavan

Skill Enhancement Courses

Chairman: Dr V.S.Gambhire.

Members: Dr.M.S.Wadikar, Dr J.N.Rajkonda, Dr Deepak Pardhe, Dr R.D.Madhekar, Dr S.V.Kachare & Dr S.A.Survase

Dr Ravi Pandurang Patil

Head

**UG & PG Dept of Botany
Deogiri College, Aurangabad.**

(Professor & Head, Dept of Botany, Deogiri College)
Chairman. Board of Studies in Botany,
Dr Babasaheb Ambedkar Marathwada University,
Aurangabad.

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1. Preamble

The education plays enormously significant role in building of a nation. There are quite a large number of educational institutions, engaged in imparting education in our country. Majority of them have entered recently into semester system to match with international educational pattern. However, our present education system produces young minds lacking knowledge, confidence, values and skills. It could be because of complete lack of relationship between education, employment and skill development in conventional education system. The present alarming situation necessitates transformation and/or redesigning of education system, not only by introducing innovations but developing “learner-centric approach in the entire education delivery mechanism and globally followed evaluation system as well.

Majority of Indian higher education institutions have been following marks or percentage based evaluation system, which obstructs the flexibility for the students to study the subjects/courses of their choice and their mobility to different institutions. There is need to allow the flexibility in education system, so that students depending upon their interests and aims can choose inter disciplinary, intra-disciplinary and skill-based courses. This can only be possible when choice based credit system (CBCS), an internationally acknowledged system, is adopted. The choice based credit system not only offers opportunities and avenues to learn core subjects but also exploring additional avenues of learning beyond the core subjects for holistic development of an individual. The CBCS will undoubtedly facilitate us bench mark our courses with best international academic practices.

Today plant science is a becoming an important discipline because of its inputs in the welfare of human society. Botanists are consistently working on the almost all the facets of the plant science like Plant Morphology, Plant Taxonomy, Plants Anatomy, Plant Physiology, Palaeobotany, Palynology, Algology, Bryology, Pteridology, Mycology, Plant Pathology, Cytogenetics, Phytogeography, Phytochemistry, Medicinal Plants, Ethnobotany, Pharmacology, Evolutionary Biology, Phylogeny, Molecular genetics, Plant Breeding, Ecology & Environment, Environmental Impact Assessment, Developmental Biology, Cell biology, Biochemical studies, Biophysics, Bioinformatics, etc. Because of which plant science has shown enormous gain in information and applications owing to incredible inputs from research in all its aspects. With global recognition of the necessitate for conservation, field plant biologists have contributed appreciably in assessing plant diversity. New insights have been gained in functional and structural aspects of plant development by utilizing novel tools and techniques for botanical

research. Keeping these advancements in view, a revision of the curriculum at the undergraduate level is perfectly timed. Therefore, the Botany students shall have the benefit of updated, balanced and carefully prepared course with giving due weightage to every branches of botany over the six semesters. It is essential for the undergraduate students to acquaint themselves with various tools and techniques for exploring the world of plants up to the very advance level, so that they can select the proper line of their PG studies and research. Keeping the employment entrepreneurship in mind, applied courses should have also been introduced. These courses shall provide the botany students hands on experience and professional inputs. On the whole, the curriculum is a source of lot of information and is supported by practical training. It is hoped that a student graduating with Botany subject with the new curriculum will be having sufficient information and knowledge to indulge interest in the subject and selecting the future line of his studies & research.

2. Choice Based Credit System (CBCS):

The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill based courses. The courses can be evaluated following the grading system, which is considered to be better than the conventional marks system. Therefore, it is necessary to introduce uniform grading system in the entire higher education in India. This will benefit the students to move across institutions within India to begin with and across countries. The uniform grading system will also enable potential employers in assessing the performance of the candidates. In order to bring uniformity in evaluation system and computation of the Cumulative Grade Point Average (CGPA) based on student's performance in examinations, the UGC has formulated the guidelines to be followed.

Advantages of the choice based credit system:

1. Shift in focus from the teacher-centric to student-centric education.
2. Student may undertake as many credits as they can cope with (without repeating all courses in a given semester if they fail in one/more courses).
3. CBCS allows students to choose inter-disciplinary, intra-disciplinary courses, skill oriented papers (even from other disciplines according to their learning needs, interests and aptitude and more flexibility for students).
4. CBCS makes education broad-based and at par with global standards. One can take credits by combining unique combinations. For example, Physics with Economics, Microbiology with Chemistry or Environment Science etc.
5. CBCS offers flexibility for students to study at different times and at different institutions to complete one course (ease mobility of students). Credits earned at one institution can be transferred.

3. Applicability of the Grading System

These guidelines shall apply to all undergraduate level degree, diploma and certificate programs under the credit system awarded by the University.

4. Definitions of Key Words:

4.1. Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.

4.2 Choice Based Credit System (CBCS): The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses).

4.3. Course: Usually referred to, as 'papers' is a component of a program. All courses need not carry the same weightage. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/laboratory work/ field work/outreach activities/project work/vocational training/viva/seminars/term papers/assignments/presentations/self-study etc. or a combination of some of these.

4.4. Credit Based Semester System (CBSS): Under the CBSS, the requirement for awarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.

4.5. Credit Point: It is the product of grade point and number of credits for a course.

4.6. Credit: A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work for 15 weeks in a semester.

4.7. Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

4.8. Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.

4.9. Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

4.10. Program: An educational program leading to award of a Degree, diploma or certificate.

4.11. Semester Grade Point Average (SGPA): It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.

4.12. Semester: Each semester will consist of 15 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to December and even semester from January to June.

4.13. Transcript or Grade Card or Certificate: Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

1. Title and Commencement

- a) These regulations shall be called "The Regulations Governing the Choice Based Credit System (Semester Scheme) in the Undergraduate Programs in the faculty of Science.
- b) These regulations shall come into force for award of the degree from the date of assent of the Chancellor (2022-2023 batch onwards).

2. Duration of the programs, requirement and Options

The total duration of the B.Sc. program shall be of 3 years. The pattern of CBCS program shall be of semester type. There shall be **SIX** semesters each of six months duration. Each semester shall consist of at least 15 weeks of study with minimum of 90 working days (Including the time spent for the conduct of final examination of each semester). The candidate shall complete courses equivalent to at least 149 credits to become eligible for the Regular Bachelor Degree. He/she shall be eligible to rejoin the program within three years to complete the degree. Further, all candidates will be awarded Bachelor Degree on successful completion of SIX semesters (Three academic years) of the undergraduate program in the subject of their choice.

3. Eligibility for Admission: A candidate who has passed the 10+2 Science examination conducted by the State Education Board or any other examination considered as equivalent thereto shall be eligible for admission to this program. Generally a candidate to opt a subject should have studied that subject at the qualifying examination.

A Candidate who passed Diploma in Pharmacy of Government of Maharashtra, as well as the students who passed the XIIth Vocational with Horticulture or Seed Technology or Crop Science or Fishery Science or Dairy Science are eligible for B.Sc. 'B' Group subject such as Chemistry, Botany, Zoology, Dairy Science, Biotechnology and Microbiology.

4. Maximum Period for Completion of the Program

The candidate shall complete the program within the period as prescribed in the regulation governing the maximum period for completing various degree/diploma programs from the dates of admission. It is generally twice the number of years of the program. The term completing the program means passing all the prescribed examinations of the program to become eligible for the degree.

5. Medium of Instruction: The medium of instruction and examination shall be English.

6. Outline of Choice Based Credit System:

An undergraduate program degree in science disciplines may be awarded if a student completes 4 core papers each in three disciplines of choice, 2 Ability Enhancement Compulsory Courses (AECC), minimum 4 Skill Enhancement Courses (SEC) and 2 papers each from a list of Discipline Specific Elective papers based on three disciplines of choice selected.

6.1 Detailed description of courses.

1. Core courses: (12 courses for General B.Sc.): A course, which should compulsorily be studied by a candidate as core requirement is termed as Core course. An undergraduate Program degree in Science disciplines may be awarded if a student completes 4 core papers each in three disciplines of choice.

2. Elective courses: Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.

i. Discipline Specific Elective (DSE) Course:(6courses, 2 papers each from a list of Discipline Specific Elective papers based on three disciplines of choice selected above, respectively). Elective courses offered under the main discipline / subject of study is referred to as Discipline Specific Elective.

ii. Dissertation/Project*:An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher/faculty member is called dissertation/project.

iii. Generic Elective (GE) Course: An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure beyond discipline/s of choice is called a Generic Elective.

P.S.: A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective.

3. Ability Enhancement Courses (AEC): The Ability Enhancement Courses may be of two kinds: Ability Enhancement Compulsory Courses (AECC) and Skill Enhancement Courses (SEC). These are mandatory for all disciplines.

6.1.1 Ability Enhancement Compulsory Courses (AECC):

a. English Communication skill/SL

b. Environmental Science

6.1.2 Skill Enhancement Courses (SEC): (4 for General B.Sc.). SEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

- **Practical's and/Tutorials** (One each with every core and discipline /generic specific elective paper).

- **Introducing Research Component in Under-Graduate Courses**

Project work/Dissertation is considered as a special course involving application of knowledge in solving/analyzing/exploring a real life situation/difficult problem. A Project/Dissertation work would be of 6 credits. A Project/Dissertation work may be given in lieu of a discipline specific elective paper.

Norms & Procedure for Extra Credit Benefit for NSS, NCC or Sport Participation: - Universities/Institutes may evolve a system/policy about Extra Curricular Activities/ General Interest and Hobby Courses /Sports / NCC / NSS / Vocational courses / related courses on their own. **Evaluation of co-curricular and extension activities shall be as per the procedure evolved by the university from time to time.**

Course Pattern, Credit distribution and Scheme of Examination

The details of course patterns (hours of instruction per week) with course code and the scheme examination are given in A and table no.1 to 6. The syllabi of the course shall be as prescribed by the university.

6.2 Implementation of core course- (Combination among the following subject)

Approved combination among the following subjects Biochemistry, Biotechnology, Botany, Chemistry, Computer Science, Electronics, Environmental Science, Genetics, Geology, Home

Science, Instrumentation, Mathematics, Microbiology, Physics, Sericulture, Statistics, Zoology and such other subjects permitted by the university from time to time.

6.3 Implantation of Ability Enhancement Compulsory Course (AECC):

For the introduction of AE Courses, they may be divided into two categories:

AE Compulsory Courses: The universities participating in CBCS system may have common curriculum for these papers. There may be one paper each in the 1st four semester's viz. (i) Communication skills in English and SL, & one paper of Environmental Science in IVth semester. Two languages are to be studied out of which one shall be English and other shall be either an Indian language or a Foreign language other than English approved by this University such as, Sanskrit, Hindi, , Marathi, Urdu, etc., and any other language prescribed /approved by the university.

In addition to English, a candidate shall opt for any one of the two languages studied at the 10+2 or equivalent level. However, the candidate may opt for Marathi even if it is not studied at the 10+2 or equivalent level. With the permission of the University, a candidate may opt for any other language listed above even if the candidate has not studied that language at 10+2 or equivalent level.

Note-Speech/hearing/visually impaired/mentally challenged and study disabled students are exempted from studying one of the language prescribed under 1. Above

6.4 Skill Enhancement Courses: Any four skill development courses in the third, fourth, fifth and sixth semesters, one in each semester as prescribed by respective Board of Studies, the concern faculty and approved by the Academic Council. Any one SEC course to be chosen (any one from three optional subjects) from the basket of SEC courses.

- a. The SEC consists of lecture course and practical course, as decided by respective B.O.S.
- b. All three SEC (Skill Enhancement Courses) have 2 credits in respective semester.

7 Rules and regulation

7.1 Number of Core papers for all Universities has to be same for both UG Honors as well as UG Program.

7.2 Credit score earned by a student for any elective paper has to be included in the student's overall score tally irrespective of whether the paper is offered by the parent university (degree awarding university/institute) or not.

7.3 The university/Institute may plan the number of seats per elective paper as per the facility and infrastructure available.

- 7.4 Total number of credits required for the completion of programs is 149 credits.
- 7.5 The credit(s) for each theory paper/practical/tutorial/project/dissertation will be as per the details given in A, and table 1 to 6 for B.Sc. Program.
- 7.6 CGPA will be calculated on the basis of core 149 credits only.
- 7.7 Each theory credit is equivalent to 15 clock hours of teaching and each practical credit is equivalent to 30 clock hours of teaching in a semester.
- 7.8 There is 15 weeks of teacher-student interaction during the semester.
- 7.9 The Universities/Institutes may offer any number of choices of papers from different disciplines under Generic Elective and Discipline Specific Elective as per the availability of the courses/faculty.
- 7.10 Universities/Institutes may evolve a system/policy about Extra Curricular Activities/General Interest and Hobby Courses/Sports/NCC/NSS/Vocational courses/related courses on their own.
- 7.11 A student can opt for more number of Elective and AE Elective papers than proposed under the model curriculum of UGC. However the total credit score earned will not exceed 149 credits for UG Program degree.
- 7.12 The new scheme of UG courses should be given due consideration while framing the admission eligibility requirement for PG/Technical courses in Indian Universities/Institutions to ensure that students following inter and multi-disciplinary format under CBCS are not at a disadvantage. It is suggested that wherever required, obtaining 24 credits in particular discipline may be considered as the minimum eligibility, for admission in the concerned discipline, for entry to PG/Technical courses in Indian Universities/Institutions.
- 7.13 The student can perform their project any one of the optional subjects.
- 7.14 The project of the student should be examined by the external examiner at the time of ESE practical course.
- 7.15 Project work has a weightage of 2 credits as par mentioned in syllabus.
- 7.16 SL and English Communication are added as "General Interest & Hobby courses" in "AECC".
- 7.17 Each theory lecture is of 50 minutes
- 7.18 There shall be Five (5) lectures/week of 50 minutes each for 3 credits to Ability Enhancement compulsory courses (AECC) "English Communication" to align with existing B.Sc. Pattern.

7.19 There shall be Five (4) lectures/week of 50 minutes each for 3 credits to Ability Enhancement compulsory courses (AECC) “SL ” to align with existing B.Sc. Pattern.

7.20 Two credits course of 50 Marks “**Constitution of India**” is mandatory to all faculties as per Dr.Babasaheb Ambedkar Marathwada University Letter Ref. No. SU/Con./I Yr/Cur/2020/7416-25 dated 28.01.2020.

7.21 Compulsory “Computer and information Technology Course “is mandatory for science faculty as per Dr. Babasaheb Ambedkar Marathwada University regulation 1473, Reference No.ACD/NP/COMP.SCI.ENV.SCI./20086587-6786 dated 20.06.2008.This course may be included in SEC course.

7.22 For all faculty environmental studies is mandatory course for all faculties as per Dr. Babasaheb Ambedkar Marathwada University regulation 1473. Reference No.ACD/NP/COMP.SCI.ENV.SCI./20086587-6786 dated 20.06.2008.

8 Attendance and Change of subject:

- 8.1 A candidate shall be considered to have satisfied the requirement of attendance for a semester if he/she attends not less than 75% of the number of classes actually held up to the end of the semester in each subjects. There shall be no minimum attendance requirement for the Co-curricular and extension activities.
- 8.2 An option to change a language /subject may be exercised only once within four weeks from the date of commencement of the Ist semester.
- 8.3 Wherever a change in a subject is permitted the attendance in the changes subject shall be calculated by taking into consideration the attendance in the previous subjects studied.
- 8.4 If candidate represents his/her institution/university/Maharashtra state/Nation in sports/NCC/NSS/Cultural or any officially sponsored activities he/she may be permitted to claim attendance for actual number of days participated, based on the recommendation of the Head of the Institution concern. If a candidate is selected to participate in national level event such as Republic Day Parade etc., he/she may be permitted to claim attendance for actual number of days participated based on the recommendation of the Head of the Institution concerned.

9 Examination and Assessment rules:-

9.1 Assessment shall consist of End of Semester Examination (ESE) and Continuous Assessment (CA). The CA will be a continuous activity (Internal) conducted by Concern College and ESE will be conducted by University. Each CA & ESE shall have weightages of 10:40. There shall be combining passing for CA and ESE.

9.2 **Weightages** - for 2 Credits (50 Marks) paper:

9.3 CA = 10 marks and ESE = 40 marks (MCQ = 10 & Subjective & descriptive questions = 30 marks on entire syllabus).

9.4 Continuous Internal Assessment (CA)

9.5 Methods of assessment for internal examination (CA):

a. **Theory (10 marks)** – Internal test 5 marks (Two internal tests of 5 marks each and average of two test will be considered) and five marks for assignment/tutorials (Written test, Field work, Assignment, Internship, Seminar presentation, Industrial Practicum, Case study, Project work (on approval of the Head of the Centre).

b. **Practical-(10 marks);** 7 Marks for internal practical examination and 3 Marks for record book/submission of collection and filed survey report and excursion tour for each semester.

9.6 A student should obtain 40% marks in the combined examination of CA and ESE with a minimum passing of 40%.

9.7 To pass the UG degree program, a student shall have to obtain a minimum aggregate of 40% marks (P and above in the grade point scale) in each course.

9.8 If a student remains absent or fails in an internal assessment examination he/she will have a second chance with the endorsement of the principal in consultation with the concerned teacher and Head of the department. The Principal in the consultation with the concerned teacher and HOD shall decide about the genuineness of the case and decide to conduct special test to such candidate on the date suitable to the concerned teacher but before commencement of the concerned semester end examination. Such a second chance shall not be the right of student.

9.9 The marks of CA shall be published on the notice board of the department/college for information of students.

9.10 The CA marks shall be communicated to the Director, Board of Examination and Evaluation at least 10 days before the commencement of the University examinations.

9.11 CA marks shall not change. A student cannot repeat CA. In case she/he wants to repeat CA, then she/he can do only by registering their names for course during the semester in which the course is conducted and up to 3 years program provided the student has failed in that course.

9.12 Internal assessment marks shall be shown separately in the marks card. Candidate, who has failed or rejected the result, shall retain the internal assessment marks.

10 Registration for (ESE) Examination: A candidate shall register for all the papers of a semester when he/she appears for the examination of that semester for the first time.

10.1. Conduct of examination

The 3 years B.Sc. CBCS Program shall consist of 3 years consisting of 2 semesters each. Semester examination for theory papers shall be held at the end of each semester. The practical examination shall be held at the end of each year.

10.2. The outline of the distribution of maximum marks for various aspects / mechanism towards ESE (Theory and Annual practical Examination) is as follows

a. Theory examination: ESE = 40 marks (MCQ =10 & subjective & descriptive questions = 30 marks on entire syllabus)

b. Practical Examination:-

Total marks 80 for each practical paper of B. Sc. For annual examination

1. Experimental Performance: 70 marks

3. Viva-Voce on experiments and submission -10 marks

4. Certified Journal should be produced by the candidate at the time of ESE practical examination.

5. The practical examination shall be conducted by two Examiners (one internal and one external) per batch.

11. The statement of marks sheet and the answer books of practical examination shall be sent to the Director, Board of Examination and Evaluation by the Principal of the respective colleges respectively immediately after the practical examinations.

12. Letter Grades and Grade Points (Completion of degree)

The Dr. Babaseheb Ambedkar Marathwada University, Aurangabad has decided to implement “absolute grading” system. A student who earns 149 credits, shall be considered to have completed the requirement of B.Sc. degree program and CGPA will be calculated for such student. On the basis of only 149 credits.

- i. The UGC recommends a 10-point grading system with the following letter grades as given below:

Table 1: Grades and Grade Points and description:

Marks obtained	Grade	Grade pints
=> 80	O (Outstanding)	10
70-79	A+ (Excellent)	09
60-69	A (Very Good)	08
55-59	B+ (Good)	07
50-54	B(Above Average)	06
45-49	C (Average)	05
40-44	P (Pass)	04
< 40	F (Fail)	0
---	Ab (Absent)	0

Classification of degree

Classification	Overall letter Grade
First-class with Distinction	A+ and Above
First class	A
Higher Second class	B+
Second class	B
Pass	C to P

- ii. A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.
- iii. For noncredit courses ‘Satisfactory’ or ‘Unsatisfactory’ shall be indicated instead of the letter grade and this shall not be counted for the computation of SGPA/CGPA.
- iv. The statutory requirement for eligibility to enter as assistant professor in colleges and universities in the disciplines of arts, science, commerce etc., is a minimum average mark of 50% and 55% in relevant postgraduate degree respectively for reserved and general category. Hence, it is recommended that the cut-off marks for grade B shall not be less than 50% and for grade B+, it should not be less than 55% under the absolute grading system. Similarly cut-off marks shall be fixed for grade B and B+ based on the recommendation of the statutory bodies (AICTE, NCTE etc.,) of the relevant disciplines.

13. Computation of SGPA and CGPA:-

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

- i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$\text{SGPA} (S_i) = \frac{\sum (C_i \times G_i)}{\sum C_i}$$

Where C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course.

- ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.

$$\text{CGPA} = \frac{\sum (C_i \times S_i)}{\sum C_i}$$

Where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester.

- iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.
- iv. Student who have failed in a course may reappear for ESE only twice in the subsequent period. The student shall be finally declared as failed if He /she does not pass in all credits within a total period of three years. After that such students shall have to seek fresh admission as per the admission rules prevailing at that time.
- v. While marks shall be given for all examinations, they shall be converted into grades.
- vi. The semester end grade sheets shall have only grades and final grade sheets and transcripts shall have grade points average and total percentage of marks up to two decimal points. The final grade sheet shall also indicate the UG Centre to which the candidate belongs.
- vii. A student cannot register for the III/IV semester, if she/he fails to complete 75% credits of the total credits expected to be ordinarily completed within two semesters (I/II). Also a student cannot register their name for V/VI semester if he/she fail to complete 100% credits of the total credits of I& II Semesters.

14. Assessment and Grade Point Average:

- a. **The system of evaluation will be as follows:** Each CA and ESE shall be evaluated in terms of marks. The marks for CA and ESE will be added together and then converted into grade and later a grade point average.
- b. Result shall be declared for each semester.
- c. After gaining minimum number of credits towards a completion of UG program, a student will get a grade sheet with total grads earned and a grade point average.

Final Grade

CGPA	Grade
9.01-10.00	O
8.01- 9.00	A+
7.01-8.00	A
6.01-7.00	B+
5.01-6.00	B
4.01-5.00	C
4.00	P
< 4	F

- d. B+ Grade is equivalent to at least 55% of the marks as per circular No. UGC-1298/ [4619] UNI-4 dated December 11, 1999.
- e. A ten point grade system [guided by the Government of India Ministry of Human resource Development Department of Higher Education, Do No. SECYCHES/2014/139980 dated November 28, 2014].
- f. If the CGPA is higher than the indicated upper limit in three decimal digits then higher final grade will be awarded (e. g. a student getting GPA of 6.095 may be awarded B+ grade).
- g. For grade improvement a student may reappear for ESE for a minimum 40% credits.
- h. Students can appear only once for the grade improvement program only after successful completion of the degree and only within one year of completion of the Degree.
- i. The final CGPA will not be printed unless a student earns all credits from courses at UG programs.
- j. One credit is equivalent to 25 marks for evaluation purpose.
- k. The one credit is equivalent to 15 contact hours for fifteen weeks in a semester.
- l. If student failed to obtain a grade other than F in a course then such a course will not be taken into account for calculating CGPA and overall grade. In fact, all the courses in which a student has passed will be taken into account for calculating the CGPA and overall grade.
- m. The credit of SEC should be collected by the college appointed coordinator.

- n. Collected SEC credits will be communicated to controller of University examinations.
- o. The SEC consists of lecture course and practical course as decided by B.O.S
- p. The project of the student should be examined by the external examiner at the time of ESE practical course.
- q. There shall be revaluation of the answer scripts of semester-end examination of theory papers only but not internal assessment papers.

15. Promotion:

Once the student is admitted to the concern college/course, he /she will be promoted to the next semester with full carryon; subject to the registration of student in every consecutive semester. Dropout student will be allowed to register for respective semester as and when the concerned course are offered by the college, subject to the condition that his /her tenure should not exceed more than twice the duration of course from the date of first registration at parent college. The admission of concern student will be automatically get cancelled if he/she fails to complete the course in maximum period (six years/twelve semesters)

16. Standard of Passing at B. Sc. Examination

- a. For a subject all papers shall from a separate head of passing i.e. Theory, and the Practical.
- b. A student shall have to secure 40% of marks in Theory, and Practical examination separately in order to pass in those heads of passing.
- c. He shall be declared to have passed the examination if he passes in all heads of passing at Ist to VI semester examinations separately.
- d. The class will be awarded on the aggregate total of all the subjects of I, II & III years examinations, excluding the marks of English or SL at Ist to IVth Semester.

17. Rejection of Results:

- a. A candidate may be permitted to reject of the result of the whole examination of any semester. Rejection of result paper wise /subject wise shall be not be permitted. The candidate who has rejected the result shall appear for the immediately following examination.
- b. The rejection shall be exercised only once in each semester and the rejection once exercised shall not be revoked.
- c. Application for rejection of results along with the payment of the prescribed fee shall be submitted to the Dy. Registrar (Academic) through the college of study together with the original statement of marks within 30 days from the date of publication of the result.

- d. A candidate who rejects the result is eligible for only class and not for ranking.

17. Transfer of candidate: Transfer of admission is permissible only for III and V Semester for the students of the other universities and within university.

17.1. Conditions for transfer of admission of students within university.

1. His /her transfer of admission shall be within the intake permitted to the college.
2. Availability of same combination of the subjects studied in the previous college.
3. He/she shall fulfill the attendance requirements as per the University regulation.
4. He/she shall complete the program as per the regulation governing the maximum duration of completing the program.
5. He/she shall complete the program as per the regulation governing the maximum duration of completing the program.

17.2. Conditions for transfer admission of students of other Universities

- a. A candidate migrating from any other University may be permitted to join III/V semester of the degree program provided he/she has passed all the subjects of previous semesters/years as the case may be. Such candidates must satisfy all other conditions of eligibility stipulated in the regulations of this University.
- b. His/her transfer admission shall be within the intake permitted to the college.
- c. He/she shall fulfill the attendance requirements as per the University regulations
- d. The candidate who is migrating from other Universities is eligible for overall classes and not for ranking.
- e. He/she shall complete the program as per the regulation governing the maximum duration of completing the program as per this regulation.

18. Power to remove difficulties

If any difficulties arises in giving effect to the provisions of these regulations, the Vice-Chancellor may by order make such provisions not inconsistent with the Act, Statutes, Ordinance or other regulations, as appears to be necessary or expedient to remove the difficulty. Every order made under this rule shall be subject to ratification by the appropriate authorities.

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

The grade card shall contain

1. The title of the courses along with code taken by the students,

2. The credits associated with the course
 3. The grade and grade points secured by the student
 4. The total credits earned by the student in the semester
 5. The SGPA of the student
 6. The total credits earned by the student till that semester and
 7. The CGPA of the student (at the end of the VI semester)
 8. **Cumulative Grade Card:** At the end of the VIth semester, the university shall issue Cumulative Grade Card to the students showing details of Grades obtained by the students in each subject in all semesters along with CGPA and total credits earned.
- 20. Repeal and Savings:** The existing regulation governing three years Bachelor degree programs and shall stand repealed. However, the above regulation shall continue to be enforcing for the students who have been admitted to the course before the enforcement of this regulation.

Course Structure of B.Sc. program (Faculty of Science) under CBCS pattern:

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad								
Choice Based Credit System (CBCS) Structure & Curriculum								
B.Sc. Botany Three Year Undergraduate Degree Program								
Semester I								
Course	Course Code	Course Title	Periods (Periods /week)	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1A) Core Courses	BOT-111	Diversity of Cryptogams - I (Theory Paper-I)	45(3/week)	02	50	10	40	20
	BOT-112	Morphology of Angiosperms (Theory Paper-II)	45(3/week)	02	50	10	40	20
	BOT-121	Lab Course I (Based on BOT-111 and BOT-112)	45(3/week)	1.5	50	10	40	20
Ability Enhancement compulsory courses (AECC-1)	ENG-131	Communication skills in English-I	45(5/week)	03	50	10	40	20
	SL-132	Marathi/Hindi/Additional English/Urdu/Sanskrit A student can opt for any one of these languages (SL-I)	45(4/week)	03	50	10	40	20
Non-Credit Course								
			225	11.5	250	50	200	100
Total Credits for Semester I : 11.5 (Theory : 10 ; Laboratory : 1.5)								
Semester II								
Course	Course Code	Course Title	Periods (Periods /week)	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1B) Core Courses	BOT-211	Diversity of Cryptogams -II (Theory Paper-III)	45(3/week)	02	50	10	40	20
	BOT-212	Histology, Anatomy & Embryology (Theory Paper-IV)	45(3/week)	02	50	10	40	20
	BOT-221	Lab course 2 (Based on BOT-211 & BOT-212)	45(3/week)	1.5	50	10	40	20
Ability Enhancement compulsory courses (AECC-2)	ENG-231	Communication skills in English-II	45(5/week)	03	50	10	40	20
	SL-232	Marathi/Hindi/Additional English /Urdu/Sanskrit,A student can opt for any one of these languages (SL-II)	45(4/week)	03	50	10	40	20
Non-Credit Course	COI-213	Constitution of India	45(3/week)	02	50	10	40	20
Non-Credit Course	CCC-214	Compulsory Computer Course	45(3/week)	02	50	10	40	20
			315	15.5	250	50	200	100
Total Credits for Semester II : 15.5 (Theory : 14 ; Laboratory : 1.5)								

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad Choice Based Credit System (CBCS) Structure & Curriculum B.Sc. Botany Three Year Undergraduate Degree Program								
Semester III								
Course	Course Code	Course Title	Periods (Periods /week)	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1C) Core Courses	BOT-311	Core Course (Theory Paper-V) Taxonomy of Angiosperms	45(3/week)	2	50	10	40	20
	BOT-312	Core Course (Theory Paper-VI) Plant Physiology	45(3/week)	2	50	10	40	20
	BOT-321	Lab course 3 (Based on BOT -311)	45(3/week)	1.5	50	10	40	20
	BOT-322	Lab course 4 (Based on BOT -312)	45(3/week)	1.5	50	10	40	20
Skill Enhancement course (SEC-1)	SEC-313	SEC-1 Any one skill to be chosen out of two SEC-1(A) , SEC-1 (B)	45(3/week)	2	50	10	40	20
Ability Enhancement compulsory courses (AECC-3)	ENG-331	Communication skills in English-III	45(5/week)	3	50	10	40	20
	SL-332	Marathi/Hindi/ Additional English/Urdu/Sanskrit A student can opt for any one of these languages (SL-III)	45(4/week)	3	50	10	40	20
			315	15	350	70	280	140
Total Credits for Semester III : 15 (Theory : 12 ; Laboratory : 3)								
Semester IV								
Course	Course Code	Course Title	Periods (Periods /week)	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1D) Core Courses	BOT-411	Core Course (Theory Paper-VII) Gymnosperms & Utilization of Plants	45(3/week)	2	50	10	40	20
	BOT-412	Core Course (Theory Paper-VIII) Plant Ecology	45(3/week)	2	50	10	40	20
	BOT-421	Lab Course 5 (Based on BOT-411)	45(3/week)	1.5	50	10	40	20
	BOT -422	Lab Course 6 (Based on BOT -412)	45(3/week)	1.5	50	10	40	20
Skill Enhancement course (SEC-2)	SEC-413	SEC-2 Any one skill to be chosen out of two SEC-2(C) , SEC-2 (D)	45(3/week)	2	50	10	40	20
Ability Enhancement compulsory courses (AECC-4)	ENG-431	Communication skills in English-IV	45(5/week)	3	50	10	40	20
	SL-432	Marathi/Hindi/ Additional English/Urdu/Sanskrit A student can opt for any one of these languages (SL-IV)	45(4/week)	3	50	10	40	20
Additional Credits	EVS-413	Environmental Studies	45(3/week)	02	50	10	40	20
			360	17	350	70	280	140
Total Credits for Semester IV : 15 (Theory : 14 ; Laboratory : 03)								

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad								
Choice Based Credit System (CBCS) Structure & Curriculum								
B.Sc. Botany Three Year Undergraduate Degree Program								
Semester V								
Course	Course Code	Course Title	Periods (Periods /week)	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSE-1 A) Discipline Specific Elective	BOT-511	DSE-1A(1) (Theory Paper-IX) Cell Biology & Molecular Biology	45(3/week)	2	50	10	40	20
	BOT-512	DSE-1A(2) (Theory Paper-X) (Select any one paper from A1/B1/C1/D1)	45(3/week)	2	50	10	40	20
	BOT-521	Lab course 7(Based on BOT-511)	45(3/week)	1.5	50	10	40	20
	BOT-522	Lab course 8 (Based on BOT-512 A1/B1/C1/D1)	45(3/week)	1.5	50	10	40	20
Skill Enhancement course (SEC-3)	SEC-513	SEC-3 Any one skill to be chosen out of two SEC-3(E) , SEC-3 (F)	45(3/week)	2	50	10	40	20
Non-Credit Course	PEV-514	Professional Ethics and Moral Values	45(3/week)	2				
			270	11	250	50	200	100
Total Credits for Semester V : 11 (Theory : 08 ; Laboratory : 03)								
Semester VI								
	Course Code	Course Title	Periods (Periods /week)	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSE-1 B) Discipline Specific Elective	BOT-611	DSE-1B(1) (Theory Paper-XI) Genetics and Evolution	45(3/week)	2	50	10	40	20
	BOT-612	DSE-1B(2) (Theory Paper-XII) (Select any one paper from A2/B2/C2/D2)	45(3/week)	2	50	10	40	20
	BOT-621	Lab course 9(Based on BOT-611)	45(3/week)	1.5	50	10	40	20
	BOT-622	Lab course 10 (Based on BOT-612- A2/B2/C2/D2)	45(3/week)	1.5	50	10	40	20
Skill Enhancement course (SEC4)	SEC-613	SEC-4 Any one skill to be chosen out of two SEC-4(G) , SEC-4 (H)	45(3/week)	2	50	10	40	20
			225	9	250	50	200	100
Total Credits for Semester V : 09 (Theory : 06 ; Laboratory : 03)								
Total Credits for three years : Sem I (11.5) + Sem II (11.5) + Sem III (15) + Sem IV (15) + Sem V (09) + Sem VI (09) = 71 Credits								

Important Notes:

- i) **Nomenclature:** DSC- Discipline Specific Core course, SEC – Skill Enhancement Course, AECC- Ability Enhancement compulsory course, DSE- Discipline Specific Elective, UA- University Assessment (Semester End), CIA-Continuous Internal Assessment.
- ii) **There shall be one skill enhancement course (SEC) IIIrd to VIth Semester (any one SEC course to be chosen (any one from three optional subjects) from the basket of SEC courses for the respective semester.**
- iii) **Code description:** BOT code has to be decided by B o S of the respective subject while designing their respective curriculum (e.g. for Botany it will be BOT; for Electronics it will be ELE).
 - The codes for first semester courses will start from BOT-111, Second-semester courses will start from BOT-211 and so on.
 - BOT-111 : The first digit indicate the Semester Number, the second two digits indicate paper numbers for the first-semester courses and the same analogy is for the remaining semesters.
 - The codes for theory courses will start from BOT-111 (for the first semester and the same analogy is for the remaining semesters).
 - The codes for practical courses will start from BOT-121 (for the first semester and the same analogy is for the remaining semesters).
 - The codes for Ability Enhancement compulsory courses will start from BOT-131 (for the first semester and the same analogy is for the remaining semesters).
- iv) **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- v) **Continuous Internal Assessment (CIA): Theory** (10 Marks): Internal Test 05 Marks (Two Internal Tests of 05 marks each and average of the two test will be considered) and 05 Marks for Assignment/tutorials.
- vi) **Continuous Internal Assessment (CIA): Practical** 10 Marks for record book/submission of collection and field survey report and excursion report and viva voce.
- vii) **Practical examination:** Annual examination.

Curriculum for Semester I (w.e.f. Academic Year 2022-23)

B. Sc. I Year (Theory) Semester - I BOT 111 Paper I (Diversity of Cryptogams - I)

Lectures – 45

Total Credits – 2

Unit - 1	Credit – 0.4
1.1 Viruses: General characters, classification based on host, economic importance, TMV – structure and multiplication	(03)
1.2 Mycoplasma: General characters (Little leaf of Brinjal)	(01)
1.3 Bacteria: General characters, ultra-structure, classification based on shape, reproduction, economic importance, Citrus Canker.	(05)
1.4 Cryptogams: General characters, classification according to G.M. Smith up to class level	(01)
Unit – 2	Credit – 0.7
2.1 General characters, classification according to F.E. Fritsch (1935) up to the class level, and economic importance of Algae	(02)
2.2 Systematic position, occurrence, structure, reproduction (excluding development of sex organs) and graphic life cycle with respect to following types:	
a) Cyanophyceae – <i>Nostoc</i>	(02)
b) Chlorophyceae – <i>Chara</i>	(03)
c) Xanthophyceae – <i>Vaucharia</i>	(02)
d) Phaeophyceae – <i>Sargassum</i>	(03)
e) Rhodophyceae – <i>Batrachospermum</i>	(03)
Unit – 3	Credit -0.7
3.1 General characters, classification according to Alexopoulous and Mims (1979) up to the class level, Economic importance of Fungi.	(04)
3.2 Systematic position, occurrence, structure, reproduction and graphic life cycle with respect to the following types:	
a) Oomycetes – <i>Albugo</i>	(02)
b) Zygomycetes – <i>Mucor</i>	(02)
c) Ascomycetes – <i>Eurotium</i>	(02)
d) Basidiomycetes – <i>Agaricus</i>	(03)
e) Deuteromycetes – <i>Cercospora</i>	(02)
3.3 Lichen: Types of Lichens, <i>Usnea</i> , Economic Importance of Lichens.	(03)
Unit – 4	Credit -0.2
Continuous Internal Assessment (CIA): Tutorials and Assignments	(5)
Note: Internal assessment lectures should be used to assess student's credibility and knowledge of the above topics. Conduct two internal tests of five marks and average it for 5 marks and Assessment or Tutorials for 5 marks. In assessment you are free to use different assessment methods.	

B. Sc. I Year (Theory) Semester - I
BOT 112 Paper - II (Morphology of Angiosperms)

Lectures – 45

Total Credits - 2

Unit – 1

Credits:01

1.1- Basic body plan of flowering plant, modular type of growth, diversity of plant forms - Herbs, Shrubs, Trees, Climbers; annuals, biennials and perennials. (04)

1.2 Morphology of vegetative organs:

a) Root: Characteristics, functions, regions of root, types – tap roots and adventitious roots, modification of root for storage, mechanical support and vital functions. (05)

b) Stem: Characteristics, functions, modification – underground, sub-aerial and aerial (05)

c) Leaf: Parts of typical leaf, phyllotaxy, types (simple and compound), diversity in shape and size, venation and modifications of leaf. (09)

Unit – 2

Credits: 01

Morphology of reproductive organs:

2.1 Inflorescence: Racemose, Cymose and special types (05)

2.2 Flower: Definition, Parts of typical flower, structure, function and modification of calyx, corolla, androecium, gynoecium, aestivation and placentation (12)

2.3 Fruit: Types of fruits (03)

2.4 Fruit and Seed dispersal strategies. (02)

Unit – 3

Continuous Internal Assessment (CIA): Tutorials and Assignments (5)

Note: Internal assessment lectures should be used to assess student's credibility and knowledge of the above topics. Conduct two internal tests of five marks and average it for 5 marks and Assessment or Tutorials for 5 marks. In assessment you are free to use different assessment methods.

B. Sc. I Year (Practical) Semester - I
Lab Course I : BOT 121
(Practical Based on Theory Papers – BOT-111 & BOT- 112)

Lectures – 45

Credits – 1.5

Practical through temporary mounting, permanent slides, charts, models, microphotographs, and audiovisual aids

1. Electron micrographs/Models of viruses – TMV, Mycoplasma and Types of Bacteria
2. Algae: *Nostoc*, *Chara*
3. Algae: *Vaucharia*, *Batrachospermum*
4. Algae: *Sargassum*
5. Fungi: *Albugo*, *Mucor*,
6. Fungi: *Eurotium*, *Agaricus*
7. Fungi: *Cercospora* and
8. Lichens – *Usnea*
9. Study of root and Stem with its modifications
10. Study of leaf and its diversity and modification
11. Study of flower (*Hibiscus* and *Datura*) and inflorescence
12. Forms and Aestivation of corolla,
13. Structure of stamen- adhesion and cohesion, Structure of carpel and placentation
14. Study of fruits and seeds
- 15. Internal Assessment**

Continuous Internal Assessment (CIA): 07 marks for internal practical examination and 03 marks for Record Book / Submission of collection and field survey report / excursion report.

Note for Lab course: Candidate shall submit the following at the time of exam.

1. Certified laboratory course record book.
2. Field note book / Submission of collection and field survey report / excursion /Tour report.
3. Collection of specimens from algae, fungi, leaves, stem, root, flowers, fruits and seeds.

In addition to number of practical prescribed above, the students are required to undertake field excursions to the places of botanical interest and industrial places under the guidance of teacher. There shall be frequent study tours in local areas. T.A. and D.A. be paid to the teachers, peons and field collectors as per university rules. The record book is to be signed periodically by teacher in charge and certified by the Head of Department at the end of the term. Candidate should not be allowed to appear for practical examination without a certified record book or a certificate from the Head of Department.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Theory Question Paper

B. Sc. I Year (Theory) Semester - I

BOT 111 Paper I (Diversity of Cryptogams - I)

Time: 2 Hour

Max. Marks: 40

- N.B.: i) Attempt all questions
ii) All questions carry equal marks
iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question(Unit 2) 10

or

Describe in brief:

- a. Short answer type(Unit 2)
b. Short answer type(Unit 2)

Q.2. Long answer type question(Unit 3) 10

or

Describe in brief:

- a. Short answer type(Unit 3)
b. Short answer type(Unit 3)

Q.3. Write short notes on: (Any two) 10

- a. Short note (Unit 1)
b. Short note (Unit 1)
c. Short note (Unit 1)

Q.4 MCQ (10 questions from all units) 10

DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Theory Question Paper

B. Sc. I Year (Theory) Semester - I

BOT 112 Paper - II (Morphology of Angiosperms)

Time: 2Hour

Max. Marks: 40

- N.B.: i) Attempt all questions
ii) All questions carry equal marks
iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question(Unit 1) 10

or

Describe in brief:

a. Short answer type(Unit 1)

b. Short answer type(Unit 1)

Q.2. Long answer type question(Unit 2) 10

or

Describe in brief:

a. Short answer type(Unit 2)

b. Short answer type(Unit 2)

Q.3. Write short notes on: (Any two) 10

a. Short note (Unit 1)

b. Short note (Unit 2)

c. Short note (Unit 1/2)

Q.4 MCQ (10 questions from all units) 10

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Practical Question paper Examination

B. Sc. I Year (Practical) Semester - I

Lab Course Code: BOT 121 (Based on BOT 111 & 112)

Time: 2 Hour Max.

Marks:

50

Date: _____ Batch No. _____

Center: _____

Q. 1. Identify, classify and describe any two algae from the given mixture 'A', Based on BOT 111 (Unit

1). 08.

Q.2. Identify, classify and describe the given specimen of fungi 'B', Based on BOT 111 (Unit 2) 08

Q.3. Identify, describe the structure, modification & pollination mechanism in the given flower. (BOT 112) 08

Q.4. Identify & describe the structure / modification in the given specimens 'C' & 'D' (Root, stem, leaf, Flower, Inflorescence, Fruit). 08

Q.5. Identify and describe the specimen E, F, G and H as per the instructions 08

(E- Algae/ Fungi, F Lichens/Bacteria, G- Morphology and H - Economic importance)

Q.4. Submission: 10

a) Record book

b) Tour report, field collection and viva - voce

Curriculum for Semester II (w.e.f. Academic Year 2022-23)

B. Sc. I Year (Theory), Semester-II BOT 211 Paper - III (Diversity of Cryptogams - II)

Lectures – 45

Total Credits - 2

Unit- 1 **Credit -0.8**

1. Bryophytes:

- 1.1 General characters of bryophytes, classification as per G. M. Smith (02)
- 1.2 Systematic position, structure, reproduction (excluding developmental stages) and alternation of generation of the following types:
- a) *Marchantia* (05)
 - b) *Anthoceros* (04)
 - c) *Funaria* (04)
- 1.3 Economic Importance of Bryophytes (02)

Unit 2 **Credits -1.2**

2. Pteridophytes:

- 2.1 General characters of Pteridophytes, classification as per G. M. Smith (03)
- 2.2 Systematic position, structure and reproduction (excluding developmental stages) and alternation of generations of the following types:
- a) Fossil Type- *Rhynia* (02)
 - b) Psilopsida – *Psilotum* (02)
 - c) Lycopsida – *Lycopodium*, *Selaginella* (10)
 - d) Sphenopsida – *Equisetum* (04)
 - e) Pteropsida – *Marsilea* (05)
- 2.3 Stellar Evolution in Pteridophyta (02)

Unit – 3

Continuous Internal Assessment (CIA): Tutorials and Assignments (05)

Note: Internal assessment lectures should be used to assess student's credibility and knowledge of the above topics. Conduct two internal tests of five marks and average it for 5 marks and Assessment/Tutorials for 5 marks. In assessment you are free to use different assessment methods.

B. Sc. I Year (Theory), Semester – II

BOT 212 Paper - IV (Histology, Anatomy and Embryology)

Lectures – 45

Total Credits - 2

Unit – 1 **Credit – 0.7**

Histology:

1.1 Types of tissue:

a) Meristematic tissue – Meristem, structure and types based on origin and position. (03)

b) Permanent tissues: Simple, Complex and Secretary (05)

c) Epidermal tissues: Types with examples Trichomes and Stomata (04)

1.2 Histological organization of root and shoot apices (03)

1.3 Various theories of cellular organization (03)

Unit – 2 **Credit -0.7**

Anatomy:

a) Primary structure of root, stem and leaf of Monocot (Maize) and Dicot (Sunflower) (06)

b) Secondary growth in root and stem of Dicot (Sunflower) (03)

c) Anomalous secondary growth in *Dracaena* (01)

c) Wood anatomy: Growth rings, heart wood and sap wood (02)

d) Periderm: Origin, structure and functions. (02)

Unit – 3 **Credit -0.6**

Embryology:

a) Structure of anther, microsporogenesis and development of male gametophyte (02)

b) Structure and types of ovule, megasporogenesis and development of female gametophyte (*Polygonum* type). (03)

c) Pollination -Mechanism, types and agencies. (02)

d) Double fertilization and its significance (01)

e) Development of Dicot embryo (Crucifer type). (01)

f) Structure, development and types of endosperm. (02)

g) Structure of Dicot and Monocot seed types of seed germination (02)

Unit – 4

Continuous Internal Assessment (CIA): Tutorials and Assignments (05)

Note: Internal assessment lectures should be used to assess student's credibility and knowledge of the above topics. Conduct two internal tests of five marks and average it for 5 marks and Assessment/Tutorials for 5 marks. In assessment you are free to use different assessment methods.

B. Sc. I Year (Practical), Semester - II

Lab Course II, BOT 221

(Based on BOT 211 & 212, Theory Papers – III and IV)

Lectures – 45

Credits – 1.5

Practical through temporary mounting, permanent slides, charts, models, photographs, and audiovisual aids

1. Bryophyte: *Marchantia*
2. Bryophyte: *Anthoceros*
3. Bryophyte: *Funaria*
4. Rhynia image study
5. Pteridophyte: *Psilotum*, *Lycopodium*
6. Pteridophyte: *Selaginella*
7. Pteridophyte: *Equisetum*
8. Pteridophyte: *Marsilea*

9. Internal Assessment

10. Simple and Complex permanent tissue
11. Secretory and Epidermal tissues (Trichomes and Stomata)
12. Double stained permanent slide preparation of Dicot (Sunflower) and Monocot (Maize) root
13. Double stained permanent slide preparation of Dicot (Sunflower), Monocot (Maize) stem
14. Double stained permanent slide preparation of *Dracaena* stem
15. Double stained permanent slide preparation of Dicot (Sunflower) & Monocot (Maize) leaf
16. Anatomy of anther, Ovule and seed

17. Internal Assessment

Continuous Internal Assessment (CIA): 07 marks for internal practical examination and 03 marks for Record Book / Submission of collection and field survey report / excursion report.

Note for Lab course: Candidate shall submit the following at the time of exam.

1. Certified laboratory course record book.
2. Field note book, excursion report / Tour report submission.
3. Collection of specimens from Bryophyte and Pteridophyte.

In addition to number of practical prescribed above, the students are required to undertake field excursions to the places of botanical interest and industrial places under the guidance of teacher. There shall be frequent study tours in local areas. T.A. and D.A. be paid to the teachers, peons and field collectors as per university rules. The record book is to be signed periodically by teacher in charge and certified by the Head of Department at the end of the term. Candidate should not be allowed to appear for practical examination without a certified record book or a certificate from the Head of Department.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Theory Question Paper

B. Sc. I Year (Theory) Semester - I

BOT 211 Paper III (Diversity of Cryptogams - II)

Time: 2Hour

Max. Marks: 40

- N.B.: i) Attempt all questions
ii) All questions carry equal marks
iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question(Unit 1) 10

or

Describe in brief:

- a. Short answer type(Unit 1)
b. Short answer type(Unit 1)

Q.2. Long answer type question(Unit 2), 10

or

Describe in brief:

- a. Short answer type(Unit 2)
b. Short answer type(Unit 2)

Q.3. Write short notes on: (Any two) 10

- a. Short note (Unit 1)
b. Short note (Unit 2)
c. Short note (Unit 2)

Q.4 MCQ (10questions from all units) 10

DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Theory Question Paper

B. Sc. I Year (Theory) Semester - II

BOT 212 Paper - IV (Histology, Anatomy and Embryology)

Time: 2Hour

Max. Marks: 40

- N.B.: i) Attempt all questions
ii) All questions carry equal marks
iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question(Unit 1) 10

or

Describe in brief:

- a. Short answer type(Unit 1)
b. Short answer type(Unit 1)

Q.2. Long answer type question(Unit 2) 10

or

Describe in brief:

- a. Short answer type(Unit 2)
b. Short answer type(Unit 2)

Q.3. Write short notes on: (Any two) 10

- a. Short note (Unit 3)
b. Short note (Unit 3)
c. Short note (Unit 3)

Q.4 MCQ (10questions from all units) 10

DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,AURANGABAD
Faculty of Science
Pattern of Practical Question paper Examination
B. Sc. I Year (Practical) Semester - I
Lab Course II, Code: BOT 221 Paper I (Based on BOT 211& 212)

Time: 2Hour Max.

Marks: 50.

Date: _____ Batch No. _____
Center: _____

- Q. 1. Identify, classify and describe any two algae from the given mixture 'A', Based on BOT 111(Unit 1). 08.
- Q.2. Identify, classify and describe the given specimen of fungi 'B', Based on BOT 111(Unit 2)08
- Q.3. Identify, describe the structure, modification & pollination mechanism in the given flower.(BOT 112) 08
- Q.4. Identify & describe the structure / modification in the given specimens 'C' & 'D' (Root, stem, leaf, Flower, Inflorescence, Fruit). 08
- Q.5. Identify and describe the specimen E,F,G and H as per the instructions 08
(E- Algae/ Fungi, F Lichens/Bacteria, G- Morphology and H - Economic importance)
- Q.4. Submission: 10
- a) Record book
- b) Tour report, field collection and viva - voce

Suggested Readings:

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2. Annie Ragland, 1999. **Fundamentals of Botany** Vol.3. Saras publication.
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7. Dube, H. C. 1990. **An Introduction to Fungi** - Vikas Publishing House Pvt. Ltd., Delhi.
8. Eams A.J. and Mac Daniel. **An Introduction to Plant Anatomy**. TMH Edition. Tata MC. Graw Hill Publishing Co.ltd. Bombay - New Delhi.
9. Esau, **Plant Anatomy**, 1965 Wiles Eastern, New Delhi.
10. Fritsch,F.E.1945. **Structure Reproduction of Algae Vol. I&II**, Cambridge Univ Press, London.
11. Johri, B.M, 1984. **Embryology of Angiosperms**. Springer- Verlag.
12. Kumar, H. D. 1988 **Introductory Phycology**, Affiliated East-West Press Ltd.,New York.
13. Maheswari P.1971.**An Introduction to Embryology of Angiosperms**,Tata McGraw Hill, Delhi.
14. Mandahar, C. L. 1998 **Introduction to Plant Viruses** – S. Chand & Ltd., Delhi.
15. Mishra.A & Agarwal R.P.1978, **Lichens-A Preliminary Text**. Oxford-IBH.66 Janapath, New Delhi 01.
16. Pande, B.P. 1979. **Plant Anatomy**. S. Chand & Co, Ram Nagar, New Delhi.
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18. Pandey, B.P. 2007 **Botany for Degree Students**. S. Chand & Co. New Delhi.
19. Pandey.B.P. 2009. **Taxonomy of Angiosperms**. S. Chand & Co. Ltd. New Delhi.
20. Parihar, N.S.1985, **An Intro to Embryophyta–Bryophytes**. Central Book Depot. Alahabad.
21. Reddy S. M. 1996, **University Botany I : (Algae, Fungi, Bryophyta and Pteridophyta)** New Age International Publisher's Pvt Ltd
22. Robet Edward Lee.1980, **Phycology**, Cambridge University Press, London.
23. Sambamurthy A.V.2006.**Textbook of Plant Pathology**, I.K. Intnational, Pvt.Ltd, New Delhi
24. Sharma O.P. 2017, **Text Book of Algae**, Tata Mc Graw Hill Publication.
25. Singh, V. and Jain, D.K - **Taxonomy of Angiosperms** - Rastogi Publications, Meerut.
26. Singh.V., P.C. Pandey and D.K.Jain. 2003. **Embryology of Angiosperms**. Rastogi Publications. Meerut.
27. Smith, G.M. 1972. **Cryptogamic botany Vol. - II** Mc Graw Hill, New Delhi.
28. Sporne, K.R. 1976. **Morphology of Petridophytes**, BI Publications. Pvt. Ltd., New Delhi.
29. Swamy B.G.L. & Krishnamurthy K.V.1950. **From Flower to Fruit**. Tata Mc Graw Hill, Delhi.

30. Turner, P.C. A.G. MC Lennan. A.D. Bates and M.R.H. White. 1998. **Instant Notes in Molecular Biology**. Viva Books Pvt. Ltd. Chennai.
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39. http://herba.msu.ru/shipunov/school/biol_154/textbook/intro_botany.pdf
40. <https://ncert.nic.in/textbook/pdf/kebo105.pdf>
41. <https://www.wikipedia.org/>
42. <https://www.easybiologyclass.com/topic-botany/>
43. <https://www.biologyexams4u.com/2011/09/botany-notes.html>
44. <https://ncert.nic.in/>
45. <https://www.kew.org/>
46. <https://bsi.gov.in/bsi-units/en?rcu=140>
