

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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[Signature]
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.)

Refrigeration and Air Conditioning

Course Structure and Curriculum

(Outcome Based Curriculum)

Choice Based Credit System

(Effective from Academic Year 2022-23)

Dr. Babasaheb Ambedkar Marathwada University

Aurangabad – 431004 (MS) India


22/08/22

PREAMBLE

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad proposes to offer a three year Bachelor programme in Science (B.Sc.) with Refrigeration and Air Conditioning. The curriculum design of this program is undertaken in the following framework (assumptions).

- a) Although there has been remarkable progress in all sectors of education in last couple of decades, the less regulated area of the education sector-vocational training seems to have lost its significance/importance. This has led to the widening gap between the supply and demand for skilled manpower across various industries and R&D organizations. This shortage of skills has translated directly into unemployment among an increasing number of graduates who pass-out every year and are forced to be retrained in order to become marketable.

These programme are designed to produce skilled manpower so that wide variety of options in job sectors would be available and it will improve the opportunities for the unemployed youths in the country in both the private and public sectors.

- b) According to a study conducted by the Associated Chambers of Commerce and Industry of India (ASSOCHAM), there will be a deficit of 40 million working professionals by the year 2020 and the employers would face the difficulty of filling positions because of the dearth of suitable talent and skilled person.

These programme aim to provide concrete solution for these problems and would facilitate to improve:

- (i) Quality of training
 - (ii) High drop-out rates
 - (iii) Linkages with Universities and Industry
 - (iv) Inadequacy of resources
- c) These programmes are intended to offer practical training and skills needed to pursue an occupation straight away. It will provide options to the students to select the courses of their choice which are directly aligned to land a job in a chosen profession or a skilled trade. One of the end results of these programmes is to enable an individual to attain self-employment.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**Choice Based Credit System (CBCS) Curriculum****For****Faculty of Science & Technology****Course Structure and Scheme of Examination****B.Sc. Refrigeration and Air Conditioning Undergraduate Degree Program****Semester I**

	Course Code	Course Title	Teaching Time / Week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
(DSC-1A) Core Courses	RAC-111	Workshop Technology I	45 (3/Week)	2	50	10	40	20
	RAC -112	Workshop Technology II	45 (3/Week)	2	50	10	40	20
	RAC -121	Lab Course 1 (Based on RAC-111 & RAC -112)	45 (3/Week)	1.5	50	10	40	20
(DSC-2A) Core Courses	RAC -113	Electrical System	45 (3/Week)	2	50	10	40	20
	RAC -114	Electronics System	45 (3/Week)	2	50	10	40	20
	RAC -122	Lab Course 2 (Based on RAC -113 & RAC -114)	45 (3/Week)	1.5	50	10	40	20
(DSC-3A) Core Courses	RAC -115	Computer Fundamental I	45 (3/Week)	2	50	10	40	20
	RAC -116	Computer Fundamental II	45 (3/Week)	2	50	10	40	20
	RAC -123	Lab Course 3 (Based on RAC -115 & RAC -116)	45 (3/Week)	1.5	50	10	40	20
Ability Enhancement Compulsory Courses (AECC-1)	RAC -131	Communication Skills in English I	45 (3/Week)	3	50	10	40	20
	RAC -132	Marathi/Hindi A student can opt any one of these subject (SL-1)	45 (4/Week)	3	50	10	40	20
			495	22.5	550	110	440	220

Total Credits for Semester I : 22.5(Theory : 18 ; Practical : 4.5)

B.Sc. Refrigeration and Air Conditioning Undergraduate Degree Program

Total Credits for Semester II : 22.5(Theory : 18 ; Practical : 4.5)

VISION

The vision of the department is to mold the students into professional and competent technical personnel of high caliber, who can meet the industrial demands.

MISSION

The Mission of the department is to develop the employability skills as per requirement of industry & corporate sector and to impart quality education in the field of Refrigeration and Air Conditioning and manufacturing sector

B.Sc. Refrigeration and Air Conditioning

Program Educational Outcomes (PEO)

1. Have a strong foundation in Refrigeration and Air Conditioning system and its Troubleshooting and Diagnostics with an ability to solve important problems in modern technological society as valuable, productive technicians and supervisors.
2. Have a broad based background to practice B.Sc Refrigeration and Air Conditioning in the areas of Manufacturers, Service Industry, automobile and Government sectors meeting the growth expectations of stakeholders.
3. Have an ability to pursue higher studies and succeed in academic and professional careers.

Program Outcomes (PO):

The objectives of B.Sc (Refrigeration and Air Conditioning) program are to produce graduates who

PO 1: Basic knowledge: Apply knowledge of basic sciences, basic statistical, and fundamental engineering/technology to solve the broad spectrum Automobile related problems.

PO 2. Discipline knowledge & Problem Analysis: Apply transboundary knowledge of a broad spectrum of technology that encompasses (but not limited to) refrigeration, air Conditioning electronics, electrical and control system to identify Refrigeration and Air Conditioning related problems.

PO 3. Design Development of solutions: Design / develop solutions for complex engineering or technological problems or challenges for Refrigeration and Air Conditioning related problems.

PO 4. Conduct Investigation of complex problems: Use research based knowledge and research method including design of experiments/systems, analysis and interpretation of data and synthesis of information to provide valid conclusion

PO 5. Modern tools: Apply relevant and recent Automobile technologies and tools with an understanding of the limitations.

PO 6. The engineer and society: Assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to practice in field of Refrigeration and Air Conditioning

PO 7. Environment and sustainability: Apply technical solutions for sustainable development practices in societal and environmental contexts.

PO 8. Ethics: Apply ethical principles for commitment to professional ethics, responsibilities and norms of the practice also in the field of Refrigeration and Air Conditioning.

PO 9. Individual and team work: Function effectively as a leader and team member in diverse/ multidisciplinary teams.

PO 10. Communication: Communicate effectively in oral and written form.

PO 11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team, to complete project in any environment.

PO12. Life-long learning: Engage in independent and life-long learning activities in the context of technological changes also in the Automobile based industry.

Program Specific Outcomes (PSO)

PSO1: To develop proficiency in advance technology and expertise in product design and development to ensure best Refrigeration and Air Conditioning practices

PSO2: To evolve technocrats and entrepreneurs in emerging fields, to motivate higher education and research with ethical codes, conduct and commitment to social and environmental issues.

PSO3: To inculcate green and sustainable practices in automotive technologies and develop human capital with technological tools to resolve real life issues.

PSO4: Excellence in communication skills, leadership skills, ethical values and environment consciousness.

Eligibility criteria for Admission:

1. A candidate will be eligible to join 1st semester of B. Sc. Refrigeration and Air Conditioning course, if he/she has passed 10+2 examination (Science Stream)

Or

2. Passed 10+2 vocational related to any stream of recognized Board/university, or any other examination recognized as equivalent thereto.

Or

3. Passed Two Year ITI(Any Stream) or One year ITI(Any Stream) + One year NCTVT (National Council on Vocational Training)

or

4. Passed Three Year Diploma (Any Stream) in Automobile / Mechanical Engineering

Duration

The course of study of B. Sc. shall be divided in to six semesters and university examination will be held at the end of every semester in the months of November/December (for semester I, III & V) and May/June (for semester II, IV & VI) or as fixed by the University.

Medium of Instruction:

Medium of Instruction will be in English

Credit to Contact Hour Mapping:

(a) One Credit would mean equivalent of 15 contact hours for theory lecture.

(b) For lab course/ workshops/internship/field work/project, the credit weightage for equivalent hours shall be 50% that for lectures /workshop.

Attendance:

Students must have 75 % of attendance in each course for appearing examination otherwise he / she will not be strictly allowed for appearing the examination of each course.

Evaluation Methods:

The assessment will be based on 20: 80 ratio of continuous internal assessment (CIA) and semester end examination (SEE). Performance will be decided after combining performance in CIA and SEE. In case of failure in SEE in particular course(s), exam will be conducted in immediate subsequent semester. However, if a student fails in CIA (considering independent CIA score), he/she may appear for the same CIA, at his/her own responsibility in the next academic year, when the same course is offered during regular academic session

Continuous Internal Assessment (CIA):

There will be 20 marks for Continuous Internal Assessment. Two internal tests (of 20 marks each) will be conducted, after completion of 40% and 80% of the curriculum respectively. Average performance of the two tests will be considered for final marks-memo preparation. **Semester End Examination (SEE):**

- The semester end theory examination for each theory course will be of 40 marks, Therefore, the total marks shall be 50 (40 Marks SEE + 10 Marks CIA)
- Semester End Examination (SEE) time table will be declared by the university (As per university
- Pattern of semester end question paper will be as below:

The semester end examination of theory course will have two parts (10+30 = 40 Marks) Part A will be consisting of 05 questions having 2 marks each (multiple choice questions / fill in the blanks/ answer in one sentence) as compulsory questions and it should cover entire course syllabus (10 Marks)

Part B will contain 05 questions of 06 marks each with equal weightage on every module. Each of these questions will have two options, from which students will have to attempt any one.

20 to 30% weightage can be given to problems/ numerical (wherever applicable) wherein use of non-programmable scientific calculator may be allowed.

Number of sub questions (with allotment of marks) in a question may be decided by the examiner.

Regarding practical examinations, the assessment will be based on 50: 50 ratio of continuous internal assessment (CIA) and semester end examination (SEE). During each semester, student must perform at

least six experiments from every laboratory course. Internal and external (Semester end) practical examination will be conducted at the end of each semester.

Earning Credits:

At the end of every semester, a letter grade will be awarded in each course for which a student had registered. A student's performance will be measured by the number of credits that he/she earned by the weighted Grade Point Average (GPA). The SGPA (Semester Grade Point Average) will be awarded after completion of respective semester and the CGPA (Cumulative Grade Point Average) will be awarded at the respective exit point.

Grading System:

The grading reflects a student-own proficiency in the course. A ten point rating scale shall be used for the evaluation of the performance of the students to provide letter grade for each course and overall grade for the Master Programme. Grade points are based on the total number of marks obtained by him / her in all heads of the examination of the course. The grade points and their equivalent range of marks are shown in Table-I

Table I: Ten point grade and grade description

Marks Obtained %	Grade Point	Letter Grade	Description
90-100	9.00- 10	O	Outstanding
80-89	8.00-8.99	A++	Exceptional
70-79	7.00-7.99	A+	Excellent
60-69	6.00-6.99	A	Very Good
55-59	5.50-5.99	B+	Good
50-54	5.00-5.49	B	Fair
45-49	4.50-4.99	C++	Average (Above)
41-44	4.1-4.49	C	Average
< 40	4.00	F	Fail (Unsatisfactory)
	0.00	AB	Absent

Non-appearance in any examination / assessment shall be treated as the students have secured zero marks in that subject examination / assessment.

Minimum P grade (4.00 grade points) shall be the limit to clear / pass the course / subject. A student with F grade will be considered as “failed” in the concerned course and he / she has to clear the course by appearing in the next successive semester examinations. There will be no revaluation or recounting under this system.

Every student shall be awarded grade points out of maximum 10 points in each subject (based on 10 point scale). Based on the grade points obtained in each subject, Semester Grade Point Average (SGPA) and then Cumulative Grade Point Average (CGPA) shall be computed. Results will be announced at the end of each semester and CGPA will be given at respective exit point.

Computation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average)

Grade in each subject / course will be calculated based on the summation of marks obtained in all modules.

The computation of SGPA and CGPA will be as below

- Semester Grade Point Average (SGPA) is the weighted average points obtained by the students in a semester and will be computed as follows

$$\text{SGPA} = \frac{\text{Sum (Course Credits) X Number of Grade Points in concerned Course Gained by the Student}}{\text{Sum (Course Credits)}}$$

The SGPA will be mentioned on the grade card at the end of every semester.

- The Cumulative Grade Point Average (CGPA) will be used to describe the overall performance of a student in all semester of the course and will be computed as under.

$$\text{CGPA} = \frac{\text{Sum (All six Semester SGPA)}}{\text{Total Number of Semester}}$$

The SGPA and CGPA shall be rounded off to the second place of decimal.

Grade Card:

Results will be declared and the grade card (containing the grades obtained by the student along with SGPA) will be issued by the university after completion of every semester. The grade card will be consisting of following details.

- Title of the courses along with code opted by the student.
- Credits associated with the course.
- Grades and grade points secured by the student.
- Total credits earned by the student in a particular semester.
- Total credits earned by the students till that semester.
- SGPA of the student.
- CGPA of the student (at respective exit point).

Cumulative Grade Card:

The grade card showing details grades secured by the student in each subject in all semesters along with overall CGPA will be issued by the University at respective exit point.

Semester I

B.Sc. Refrigeration and Air Conditioning Undergraduate Degree Program

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	RAC -121	Lab Course 1 (Based on RAC-111 & RAC -112)	45 (3/Week)	1.5	50	10	40	20
(DSC-2A) Core Courses	RAC -113	Electrical System	45 (3/Week)	2	50	10	40	20
	RAC -114	Electronics System	45 (3/Week)	2	50	10	40	20
	RAC -122	Lab Course 2 (Based on RAC -113 & RAC -114)	45 (3/Week)	1.5	50	10	40	20
(DSC-3A) Core Courses	RAC -115	Computer Fundamental I	45 (3/Week)	2	50	10	40	20
	RAC -116	Computer Fundamental II	45 (3/Week)	2	50	10	40	20
	RAC -123	Lab Course 3 (Based on RAC -115 & RAC -116)	45 (3/Week)	1.5	50	10	40	20
Ability Enhancement Compulsory Courses (AECC-1)	RAC -131	Communication Skills in English I	45 (3/Week)	3	50	10	40	20
	RAC -132	Marathi/Hindi A student can opt any one of these subject (SL-1)	45 (4/Week)	3	50	10	40	20
			495	22.5	550	110	440	220
Total Credits for Semester I : 22.5(Theory : 18 ; Practical : 4.5)								

RAC-111: Workshop Technology I

Total Credits : 2	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Learning Objectives

1. To develop general machining skills in the students.
2. To develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude.

Course Content:

UNIT 1: General Introduction:

Scope of subject "Workshop Technology" in engineering, Different shop activities and broad division of the shops on the basis of nature of work done such as Wooden Fabrication-carpentry, Metal Fabrication

Carpentry:

(a) Fundamental of wood working operations (b) Common Carpentry Tools Their classification, size, specification (name of the parts and use only), Marking and measuring tools, Holding and supporting tools, Cutting and Sawing Tools, Drilling and Boring Tools, Striking Tools-Mallet and Claw hammer, Turning Tools & Equipment, Miscellaneous Tools

Metal Fabrication

Shaping and Forming, Smithy, sheet metal and Joining-welding, Riveting, Fitting and Plumbing

UNIT 2 Fabrications Works:

(A) Joining of Timber Components for Fabrications Works: Assembly of joints (Preparation steps and tools used only) Mortise, Tenon, Rivet, Groove, Tongue, Dowel, operations in assembly-simple lap and butt, Mortise, Tenon, Dovetail, Miter & bridle joints. Metal Fabrication

(B) Metal Shaping-Smithy: (i) Operations involved (concept only) (ii) Tool and equipment used (Names, size, specification for identification only) (iii) Heating and fuel handling equipment (iv) Holding and supporting tools (v) Striking Tools (vi) Cutting tools (vii) Punching & Drifting Tools (viii) Bending Tools and figures (ix) Forming & Finishing Tools (x) Defects Occurring & its remedy

UNIT 3 Sheet metal Working:

Sheet metal Working-Tools and operation: (1) Operations involved (Names and concept only) (2) Sheet metal joints (3) Tools and equipment used (Name, size, specifications for identification only) (4) Marking tools (5) Cutting and shearing Tools (6) Straightening tool (7) Striking Tools (8) Holding Tools (9) Supporting Tools (10) Bending tools (11) Punching-Piercing and Drafting tools (12) Burring Tools-Files (13) Defects Occurring & its remedy

UNIT 4: Tutorial & Assignment Work

Text Books:

1. Raghuwanshi B.S., Workshop Technology Vol. I & II, Dhanpath Rai & Sons.

2. Kannaiah P. and Narayana K.L., Workshop Manual, 2nd Edn, Scitech publishers.
3. John K.C., Mechanical Workshop Practice. 2nd Edn. PHI 2010.
4. Jeyapoovan T.and Pranitha S., Engineering Practices Lab Manual, 3rd Edn. Vikas Pub.2008.

Learning Outcomes

After completion of the course, student will be able to:

1. Ability to design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint.
2. Ability to design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit.
3. Ability to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder.
4. Ability to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring.
5. Ability to design and model various basic prototypes in the trade of Welding such as Lap joint, Lap Tee joint, Edge joint, Butt joint and Corner joint.

RAC -112: Workshop Technology II

Total Credits : 2	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Learning Objectives

1. To develop general machining skills in the students.
2. To develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude.

UNIT 1: Metal Joining:

(A) Metal Joining During Fabrication-

- (a) Permanent Joining: (i) Welding methods (ii) Electric welding
(b) Soldering & Brazing: (i) Its concept, comparison with welding as joining method and classification (ii) Soldering operation (iii) Materials Used (iv) Defects Occurring & its remedy

(B) Riveting

- (i) Its comparison with welding as joining method. (ii) Rivets and Materials. (iii) Operation involved (iv) Tools and equipment used (Names, Size, specification and uses)), Elementary knowledge about working of pneumatic, hydraulic and electric riveter. Temporary Joining (Fasteners & their uses), General Idea about temporary fasteners & their uses

(C) Familiarity with the Use of Various Tools Used in Mechanical Engineering Workshop

- (a) Marking & Measuring Tools (b) Holding Tools (c) Cutting Tools (d) Files (e) Thread Cutting Tools (h) Miscellaneous Tools

UNIT 2: Safety and Precautions

Importance of safety and general precautions to be observed in the shop, use of fire extinguishers, storing and handling of inflammable materials, Elementary first aid.

UNIT 3: Basic Measurement Tools

Introduction, concepts of measurements, measuring instruments such as scale, vernier, micrometer, depth gauge, bore gauge, filler gauge, screw gauge, divider, caliber, dial gauge, compression gauge and vacuum gauge.

UNIT 4: Tutorial & Assignment Work

Text Books:

5. Raghuwanshi B.S., Workshop Technology Vol. I & II, Dhanpath Rai & Sons.
6. Kannaiah P. and Narayana K.L., Workshop Manual, 2nd Edn, Scitech publishers.
7. John K.C., Mechanical Workshop Practice. 2nd Edn. PHI 2010.
8. Jeyapoovan T. and Pranitha S., Engineering Practices Lab Manual, 3rd Edn. Vikas Pub. 2008.

Learning Outcomes

After completion of the course , student will be able to:

1. Ability to design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint.
2. Ability to design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit.
3. Ability to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder.
4. Ability to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring.
5. Ability to design and model various basic prototypes in the trade of Welding such as Lap joint, Lap Tee joint, Edge joint, Butt joint and Corner joint.

RAC -121: Lab Course 1 (Based on RAC -111 and RAC -112)

Total Credits : 1.5	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

List of Practical: (any six)

1. Wood sizing exercises in planning, marking, sawing, chiseling and grooving to make half lap joint and cross lapjoint.
2. A job involving cutting, filing to saw cut, filing all sides and faces, corner rounding, drilling and tapping on M. S.plates.
3. A job on use of plumbing tools and preparation of plumbing line involving fixing of water tap and use of elbow, tee, union and coupling, etc.
4. Making a small parts using GI sheet involving development, marking, cutting, bending, brazing and soldering operations- i)Tray ii) Funnel and similararticles.
5. Exercise in Arc welding (MMAW) to make a square buttjoint.
6. Exercise in Resistance (Spot) welding to make a lap joint.
7. Ajobusing power operated tools related to sheet metal work, Welding, Fitting, Plumbing, Carpentry and patternmaking.
8. A job on turning of a Mild Steel cylindrical job using center lathe.

RAC -113: Electrical System

Total Credits : 2	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Learning Objectives

1. To introduce fundamental concepts and analysis techniques in electrical engineering to students across all disciplines.
2. To introduce the students about domestic wiring, the functioning of various electrical apparatus and the safety measures. Emphasize the effects of electric shock and precautionary measures.
3. To impart basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
4. To provide knowledge about the basic DC and AC electric circuits and magnetic circuits.

Course Content

UNIT 1. Current Electricity

Definition of Resistance, Voltage, Current, Power, Energy and their units, Relation between electrical, mechanical and thermal units, Temperature variation of resistance, Difference between AC and DC voltage and current.

UNIT 2. A.C Circuits & D.C. Circuits

Generation of A.C. voltage, its generation and wave shape. Cycle, frequency, peak value R.M.S. value, form factor, crest factor, Phase difference, power and power factor, A.C. Series Circuits with (i) resistance and inductance (ii) resistance and capacitance and (iii) resistance inductance and capacitance, Q factor of R.L.C. series circuits. Ohm's Law, Series – parallel resistance circuits, calculation of equivalent resistance, Kirchhoff's Laws and their applications.

UNIT 3. Electric Cells

Primary cell, wet cell, dry cell, battery, Li-ion battery, series and parallel connections of cells, Secondary cells, Lead Acid Cell, Discharging and recharging of cells, preparation of electrolyte, care and maintenance of secondary cells.

UNIT 4. Capacitors

Capacitor and its capacity, Concept of charging and Discharging of capacitors, Types of Capacitors and their use in circuits, Series and parallel connection of capacitors, Energy stored in a capacitor.

UNIT 5. Electromagnetic Effects

Permanent magnets and Electromagnets, their construction and use, Polarities of an electromagnet and rules for finding them. Faraday's Laws of Electromagnetic Induction, Dynamically induced e.m.f., its magnitude and induction, inductance and its unit. Mutually induced e.m.f., its magnitude and direction, Energy stored in an inductance. Force acting on a current carrying conductor in magnetic field, its magnitude and direction, Principles and construction of dynamo.

UNIT 6: Tutorial & Assignment Work

Learning Outcomes

1. Students will gain knowledge regarding the various laws and principles associated with electrical systems.
2. Students will gain knowledge regarding electrical machines and apply them for practical problems.
3. Students will gain knowledge regarding various types' semiconductors.
4. Student will gain knowledge digital electronics.
5. Student will gain knowledge on electronic systems.

Reference Books:

1. Basic Electrical Engineering, Ritu Sahdev, Khanna Publishing House
2. Basic Electrical Engineering, Pradeep Kumar, Khanna Publishing House
3. Basic Electronics, S. Biswas, Khanna Publishing House
4. All in One Electronics Simplifies, A.K. Maini, Khanna Publishing House
5. Electronic and Radio Engg. – N.D. Gupta,
6. Basic Electronics – Malvino
7. A textbook of Applied Electronics – R.S. Sedha – S.Chand and Co. Ltd. New Delhi.

RAC -114: Electronics System

Total Credits : 2	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Learning Objectives

1. To introduce fundamental concepts and analysis techniques in electrical engineering to students across all disciplines.
2. To introduce the students about domestic wiring, the functioning of various electrical apparatus and the safety measures. Emphasize the effects of electric shock and precautionary measures.
3. To impart basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
4. To provide knowledge about the basic DC and AC electric circuits and magnetic circuits.

Course Content

UNIT 1. Overview of Atom, Sub-Atomic Particles and CRO

Brief History of Electronics, Atom and its elements, Electron, Force, Field intensity, Potential, Energy, current, Electric field, Magnetic field, Motion of charged particles in electric and magnetic field Overview of CRO, Electronic and Magnetic deflection in CRO, Applications.

UNIT 2. Basics of Semiconductor

Semiconductor materials, Metals and Semiconductors and Photo-electric emission, N-type and P-type semiconductor, Effects of temperature on Conductivity of semiconductor, PN junction diode, depletion layer, Forward & Reverse bias, V-I Characteristic, Effects of temperature, Zener diode, Photo diode, LED, Types and applications of diode, Diode as a rectifier, Half wave and full wave rectification, Zener diode Regulator , Introduction to Filters, Clippers, Clampers

UNIT 3. Bipolar Junction Transistor

Operation of NPN and PNP transistors, Biasing of BJT, CB, CE and CC configuration, Introduction to FET, JFET, MOSFET, CMOS and VMOS

UNIT 4. Transistor Amplifier and Applications

Introduction, Single and Multi-stage amplifiers, Introduction to Oscillators, Introduction to Thyristors, PNPN diode, SCR, LASCR, DIAC, TRIAC

UNIT 5: Tutorial & Assignment Work

Learning Outcomes

1. Students will gain knowledge regarding the various laws and principles associated with electrical systems.
2. Students will gain knowledge regarding electrical machines and apply them for practical problems.
3. Students will gain knowledge regarding various types' semiconductors.
4. Student will gain knowledge digital electronics.
5. Student will gain knowledge on electronic systems.

Reference Books:

1. Basic Electrical Engineering, Ritu Sahdev, Khanna Publishing House
2. Basic Electrical Engineering, Pradeep Kumar, Khanna Publishing House
3. Basic Electronics, S. Biswas, Khanna Publishing House
4. All in One Electronics Simplifies, A.K. Maini, Khanna Publishing House
5. Electronic and Radio Engg. – N.D. Gupta,
6. Basic Electronics – Malvino
7. A textbook of Applied Electronics – R.S. Sedha – S.Chand and Co. Ltd. New Delhi.

RAC-122: Lab Course 2 (Based on RAC -113 & RAC -114)

Total Credits : 1.5	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Electrical System - Lab practical

1. Verify that resistance of conductor is directly proportional to resistivity and length and inversely proportional to cross- sectional area of the conductor.
2. Verification of Ohm's Law.
3. Study of series resistive circuits.
4. Study of parallel resistive circuits.
5. Study of series and parallel connection of cells in circuits.
6. Charging and Discharging of a capacitor.

Electronics System - Lab practical

1. Study of current and voltage measurement using Ammeter and Voltmeter.
2. Study of working principle of Signal Generator and measurement of amplitude, time period and frequency of signal using Oscilloscope.
4. Study of V-I Characteristic of Diode.
5. Study of V-I Characteristic of Zener Diode. And use of Zener Diode as voltage regulator.
6. Study of Half wave rectifier with and without filter circuit.
7. Study of Full wave rectifier with and without filter circuit.
8. Study CE configuration for NPN and PNP transistors and measurement of voltage and current gain.

RAC 115: Computer Fundamental I

Total Credits : 2	Contact Hours : 45 (3 Hrs/Week)
Marks: 50 (10 CA + 40 UA)	

Course Objectives:

The subject aims to provide the student with:

1. An understanding of basic concepts of computer science and engineering.
2. An introduction to the fundamentals of hardware, software and programming.
3. An introduction to mathematical software

Course Contents

Unit I: Computer Basics & I/O Device:

Algorithms, A simple model of Computer, Characteristics of Computer Description of Computer Input units, Floppy disk, Video terminal, MICR, OCR, bar coding, out put Units: Printers, Chain printer, Serial printer, letter quality printer, laser printer, and graphics display device, VDU.

Unit II: Computer Generation and classification

First generation, second generation, third generation fourth generation, and fifth generation computers, Mini, Super-mini, midi, maxi computer .

Unit III: Operating Systems:

Why do we need operating systems?, Batch operating system, multiprogramming operating systems, Time Sharing operating system, online and real time operating systems.

Unit IV: Data Representation:

Representation of Characters in computer, representation of integer, Hexadecimal representation.

Unit V: Introduction to Programming Languages

Introduction of computer languages, Classification of languages, Machine level language, Assembly Level Language, Low & High level programming language, Compiler, Interpreter, Assembler, Introduction of C, C++, Java, Advantages of using C, C++ , Java, Usage of C,C++, Java

Course Outcomes:

The student after undergoing this course will be able to:

1. Demonstrate the use of mathematical software and solve simple mathematical problems.
2. Explain the needs of hardware and software required for a computation task.
3. State typical provisions of cyber law that govern the proper usage of Internet and computing resources.
4. Explain the working of important application software and their use to perform any engineering activity.
5. Demonstrate the use of Operating system commands and shell script

Recommended Text Books:

1. Deborah Morley and Charles S. Parker; Fundamentals of Computers; Cengage Learning, India edition; 2009.
2. Alexis Leon and Mathews Leon; Fundamentals of Information Technology; Vikas Publication, Chennai.

3. Francis Scheid; Theory and Problems of Introduction to Computer Science Schaum's Outline Series; Tata McGraw Hill publication.
4. Information Technology: Tools and Application, Ed. UPTEC Computer Consultancy Limited, Elsevier Publication, 2004.
5. Rudra Pratap ;Getting started with MATLAB: A quick introduction for scientists and engineers; Oxford University press; 2003.
6. W. L. Palm III ; Introduction to MATLAB 7 for Engineers; McGraw Hill; 2005.
7. Rajeshree R Khande and Manisha Maddel ; Internet Programming & Industrial Law; Vision Publications, Pune.

RAC 116: Computer Fundamental II

Total Credits : 2	Contact Hours : 45 (3 Hrs/Week)
Marks: 50 (10 CA + 40 UA)	

Learning Objectives

To enable the students to study MS Office and to enrich the practical knowledge in MS Office.

Course Contents

Unit 1: Word Processing

Overview of Word Processing, Creating and Editing a Document, Revising and Refining a Document, Using Additional Word Features, Changing the Display of the Document, Using Standard Templates, Using Mail Merge

Unit 2: Spreadsheet Applications

Overview of Excel, Creating and Editing, Using Charts, Managing a Workbook, Using of Basic mathematical Formulae, Sorting and Filtering of data in a workbook

Unit 3: Presentation Graphics

Overview of Presentation Graphics, Creating a Presentation, Modifying and Refining a Presentation, Using Advanced Presentation Features

Unit 4: Database Management Systems

Overview, Creating a Database, Modifying a Table, Creating Forms, Queries and Reports, Protecting the Database

Unit 5: Internet

Internet Basics, Navigating the Web, Finding Information on the Web, Communication Using E-Mail, Sending SMS through Web, Creating a Blog

References:

1. Microsoft Office Word 2007 a Beginners Guide: A Training Book of Microsoft Word 2007, By W.R. Mills, United States of America, Bloomington, Indiana.
2. Microsoft Office Excel 2007: Comprehensive Concepts and Techniques, By Greg B. Shelly, Thomas J. Cashman, Jeffrey J. Quasney.
3. Microsoft Office Power Point 2007: Illustrated Introductory: Introductory, By David Beskeen
4. Microsoft Office Access 2007: Comprehensive Concepts and Techniques, By Thomas J. Cashman, Philip J. Pratt
5. Basic Internet, By O.H.U. Heathcote

Learning Outcomes

After successful completion of this course, students will be

1. Able to perform documentation and presenting skills.
2. Proficient in using Windows, Word Processing Applications, Spreadsheet Applications, Database Applications and Presentation Graphics Applications.

RAC 123: Lab Course 3 (Based on RAC -115 & RAC -116)

Total Credits : 1.5	Contact Hours : 45 (3 Hrs/Week)
Marks: 50 (10 CA + 40 UA)	

Lab Practical

1. Demonstration of I/O Devices
2. Demonstration of Programming Languages in real time application
3. Exercise on Word Processing
4. Exercise on Spreadsheet Applications
5. Exercise on Presentation Graphics
6. Exercise on Database Management Systems
7. Exercise on Creating Forms on Google
8. Exercise on Finding Information on the Web
9. Exercise on Communication Using E-Mail,
10. Exercise on Creating a Blog

RAC-131 Communication Skills in English I

Total Credits : 3	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Aims and Objectives:

1. To make the students aware of basic language skills;
2. To train them to read and write well in English;
3. To make the students competent speakers and listeners of English;
4. To enhance the confidence level of the students for application of English;
5. To develop word power of the students.

Contents of the Course: Semester I

I. Prose: 15 Marks

1. The Essence of Democracy- B. R. Ambedkar
2. Orpheus and Eurydice- William Byron Forbush
3. A Tribute to the Buddha- Sayaji Maharaj Gaekwad
4. Facebook is Making us Miserable- Daniel Gulati
5. Sir Isaac Newton- Nathaniel Hawthorne

II. Poetry: 15 Marks

1. A Prayer for My Daughter- W. B. Yeats
2. A Psalm of Life- H W Longfellow
3. The Bus- Arun Kolatkar
4. Let Me Not to the Marriage of True Minds- William Shakespeare
5. Night of the Scorpion- Nissim Ezekiel

III. Grammar and Composition: 10 Marks

1. The Clause Elements (S, V, O, C, A)
2. The Articles and Prepositions: Kinds and Usage
3. The Tenses: Kinds and Usage
4. Marathi Alternatives to English Words
 - a. Email Writing
 - b. Job Application with CV
 - c. News and Report Writing
 - d. Self-Introduction

IV. Internal Evaluation (Semester I): 10 Marks

1. PowerPoint Presentation on great/famous people, sportspersons, etc.
OR
2. Essay Writing/Review Writing on a book, film, well-known regional person, reformer, politician, social activist, etc.

Prescribed Textbook: *Elegance of Language I* by Board of Editors, BAMU
(Published by: Macmillan Publishers India, Private Ltd, 2021)

WT-132 Marathi/Hindi
A student can opt any one of these subject (SL-1)

Total Credits : 3	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Marathi

डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद.

बी.ए./बी.एससी.प्रथम वर्ष सत्र पहिले CBCS पध्दतीनुसार जून २०२२ पासून लागू

भारतीय भाषा : मराठी (भाग-१)

संकेतांक - AECC-1 Marathi

तासिका - ५७ तास - ४५ श्रेयांक - ०३ गुण - ५० (लेखी परीक्षा-४०, प्रात्यक्षिक -१०)

अ. क्र.	घटक	अभ्यासक्रमाचा तपशील	श्रेयांक	तास
१.	काव्य विभाग	१. वचन - महात्मा बसवेश्वर २. इये मन्हाठिचिये नगरी - संत ज्ञानेश्वर ३. अवघा रंग एक झाला - संत सोयराबाई ४. पतित तू पावना - संत कान्होपात्रा ५. बाजार - संत एकनाथ ६. चित्त शुद्ध तरी - संत तुकाराम ७. चंदनाचा संग लाधलिचा वृक्ष - संत बहिणाबाई ८. फटका - अनंत फंदी ९. तयास मानव म्हणावे का ? - सावित्रीबाई फुले १०. आम्ही कोण ? - केशवसुत ११. देव दिसला, देव कोठे ? - बहिणाबाई चौधरी १२. फुलराणी - बालकवी	०१	१५
२.	गद्य विभाग व उपयोजित मराठी	१. रुंभण्याचा दृष्टांत - केशीराज बास २. मराठी ग्रंथकार सभेस पत्र - महात्मा फुले ३. स्त्री- पुरुष तुलना - ताराबाई शिंदे ४. शील व सौजन्य - डॉ. बाबासाहेब आंबेडकर	१.५	२३

		५. कला व जीवन - साने गुरुजी ६. डोळे - अण्णा भाऊ साठे उपयोजित मराठी (०४ घटक)		
३.	प्रकल्प / प्रात्यक्षिक / स्वाध्याय	अध्यापकांनी विद्यार्थ्यांच्या कौशल्यांना उपयुक्त असे विषय प्रकल्प / प्रात्यक्षिक / स्वाध्यायाकरिता मार्गदर्शन करणे अपेक्षित आहे.	०.५	०७
		एकूण	०३	४५

7.10

Hindi

बी. ए./ बी. एस्सी. / बी. कॉम./ बी. एफ. ए./ बी. एस. डब्ल्यू प्रथम वर्ष प्रथम सत्र (SEM-I)

(द्वितीय भाषा)

प्रश्नपत्र - सामान्य हिन्दी

HIN SL - AECC - 1

अंक 50

उद्देश्य :

साहित्य संवेदनाओं का विकास कराना।

हिन्दी कहानी का सामान्य परिचय कराना।

कहानी का रसास्वादन एवं सृजन क्षमता का विकास कराना।

भाषा कौशल का विकास कराना।

अध्ययन-अध्यापन पद्धति

1) व्याख्यान

2) दृक-श्राव्य माध्यम

3) सेमिनार

4) चर्चासत्र

पाठ्यक्रम :

अ) कहानी साहित्य

अंक - 30

पाठ्यपुस्तक - 1) कथा द्वादशी - सम्पादक हिन्दी अध्ययन मण्डल, वाणी प्रकाशन, नई दिल्ली

पाठ्यक्रम में समाविष्ट कहानियाँ :-

1. प्रेमचन्द - पूस की रात
2. जयशंकर प्रसाद - ममता
3. सुदर्शन - हार की जीत
4. भगवतीचरण वर्मा - मुगलों ने सल्तनत बख्श दी
5. फणीश्वरनाथ रेणु - तीसरी कसम
6. अमरकान्त - डिप्टी कलकटरी
7. मोहन राकेश - आर्द्रा
8. धर्मवीर भारती - गुलकी बन्नो
9. मन्नू भण्डारी - यही सच है
10. उषा प्रियंवदा - वापसी
11. रमणिका गुप्ता - दाग दिया सच
12. स्वदेश दीपक - रफूजी

आ) हिन्दी भाषा :

अंक 20

1. हिन्दी भाषा उद्गम और विकास : सामान्य परिचय
2. हिन्दी मानक वर्णमाला एवं अंक लेखन
3. व्याकरणिक कोटियाँ- लिंग, वचन, कारक
4. भाषा कौशल - श्रवण, भाषण, वाचन एवं लेखन

सन्दर्भ ग्रन्थ :

- 1) हिन्दी कहानी के सौ वर्ष - डॉ. एन. एम. सण्णी, जवाहर पुस्तकालय आगरा
- 2) हिन्दी कहानी: अन्तरंग पहचान - रामदरश मिश्र, वाणी प्रकाशन, नई दिल्ली
- (3) समकालीन कहानी नया परिप्रेक्ष्य - पुष्पपाल सिंह, सामयिक प्रकाशन, नई दिल्ली
- (4) हिन्दी भाषा का उद्गम और विकास - उदयनारायण तिवारी, लोकभारती प्रकाशन, नई दिल्ली
- 5) भाषा विज्ञान - भोलानाथ तिवारी वाणी प्रकाशन, नई दिल्ली
- (6) भाषा शिक्षण - डॉ. हणमन्तराव पाटिल, डॉ. सुधाकर शेंडगे, विद्या प्रकाशन, कानपुर
- 7) व्यावहारिक हिन्दी व्याकरण हरदेव बाहरी लोकभारती प्रकाशन, इलाहाबाद
- 8) प्रयोजनमूलक हिन्दी - डॉ. माधव सोनटक्के, लोकभारती प्रकाशन, इलाहाबाद
- 9) व्यावहारिक हिन्दी - डॉ. माधव सोनटक्के, जयभारती प्रकाशन, इलाहाबाद
- 10) प्रयोजनमूलक हिन्दी - डॉ. अंबादास देशमुख, शैलजा प्रकाशन, कानपुर

प्रोफेसर डॉ. शिवाजी सांगोळे
अध्यक्ष
हिन्दी अभ्यास मंडळ (B.O.S)
डॉ. बाबासहेब आंबेडकर मराठवाडा
विद्यापीठ, औरंगाबाद

प्रश्नपत्र का प्रारूप एवं अंक विभाजन
प्रथम सत्र (Sem - I)

प्रश्नपत्र - सामान्य हिन्दी

HIN SL - AECC-1

अंक- 50

लिखित परीक्षा 40

अंतर्गत मूल्यांकन - 10

अंक : 40

सूचना:

- 1) पहला और दूसरा प्रश्न अनिवार्य हैं।
- 2) शेष प्रश्नों में से किन्हीं चार के उत्तर लिखने हैं।
- 3) कुल छह प्रश्न लिखने हैं।
- 4) दायीं ओर प्रश्नों के पूर्णांक दिये हैं।

प्र. 1 समग्र पाठ्यक्रम पर वस्तुनिष्ठ प्रश्न	10
(अ) रिक्त स्थानों की पूर्ति कीजिए।	
(आ) एक वाक्य में उत्तर लिखिए।	
प्र. 2 कथा द्वादशी पर विकल्प सहित ससन्दर्भ व्याख्या कीजिए। (अ + आ)	06
प्र. 3 कथा द्वादशी पर दीर्घोत्तरी प्रश्न	06
प्र. 4 कथा द्वादशी पर दीर्घोत्तरी प्रश्न	06
प्र. 5 कथा द्वादशी पर दीर्घोत्तरी प्रश्न	06
प्र. 6 हिन्दी भाषा के पाठ्यक्रम पर दीर्घोत्तरी प्रश्न	06
प्र. 7 हिन्दी भाषा के पाठ्यक्रम पर दीर्घोत्तरी प्रश्न	06
प्र. 8 टिप्पणियाँ लिखिए।	06
अ) कथा द्वादशी पर विकल्प सहित टिप्पणी	
आ) हिन्दी भाषा के पाठ्यक्रम पर विकल्प सहित टिप्पणी	

अन्तर्गत मूल्यांकन परीक्षा 05 अंक

सेमिनार (संगोष्ठी) - 05 अंक

नोट - अन्तर्गत मूल्यांकन में दो बार पांच-पांच अंको की लिखित परीक्षा लेनी है और जिसमें अधिकतम अंक प्राप्त होंगे उसे अन्तिम परिणाम के रूप में स्वीकृत करना है।



Semester II

B.Sc. B.Sc. Refrigeration and Air Conditioning Undergraduate Degree Program

Total Credits for Semester II : 22.5(Theory : 18 ; Practical : 4.5)

RAC-211: Elements of Mechanical Engineering

Total Credits: 2	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Learning Objectives:

1. Learn the fundamental concepts of energy, its sources and conversion.
2. Comprehend the basic concepts of thermodynamics.
3. Learn the fundamental concepts of properties of steam
4. Enumerate the knowledge of working with Mechanical Energy converting Devices

Unit I: Basic Concepts of Mechanical Engineering

Introduction Dimensions and units of physical quantity, system and surrounding, working substance, Definition and meaning of the usual term such as pressure, temperature, specific volume, density, energy, heat, work, power working principles of temperature and pressure measuring instruments used in practice.

Unit II: Laws of thermo dynamics.

Introduction, Internal energy, Laws of conservation of mass, momentum and energy, relation between work and heat enthalpy, Reversible and Irreversible process. Entropy, first law of thermodynamics limitation and applications. Second law of thermodynamic and it applications

Ideal and real Gases: Introduction, Boyle's law charl's law characteristics equation for gases specific that's of gases, Non flow process using goal gas. Reduced properties.

UNIT III: Properties of Steam-

Introduction vapors as working substances, application of state in practice, generation of steam of constant pressure, important proportions of steam Thermodynamic processes using steam as working substance. Fuel and Combustion- Introduction, classification heating values of fuels

UNIT IV: Mechanical Energy converting Devices-

Introduction, construction main parts and working of mechanical prime movers duplicating. Steam engine, working of steam, work done, Mean effective pressure, Indicated power of engineer brake power and mechanical efficiency, Energy consuming devices- Reciprocating Air compressor, Refrigerator

UNIT V: Tutorial & Assignment Work

Reference:-

1. Mechanical Technology by Kulkarni R.S
2. Elements of Mechanical Engineering P.B. Joshi & U.S. Tumne
3. Thermal Engineering by R.K. Rajant

Learning Outcomes:

1. Understand concepts of energy, its sources and conversion.
2. Understand the basic concepts of thermodynamics.
3. Explain the fundamental concepts of properties of steam

RAC -212: Engineering Materials

Total Credits: 2	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Learning Objectives:

The objective of the course is to provide basic understanding of engineering materials, their structure and the influence of structure on mechanical, chemical, electrical and magnetic properties.

Learning outcomes:

1. Classify engineering materials based on their structure.
2. Draw crystallographic planes and directions.
3. Distinguish between elastic and plastic behavior of materials.
4. Distinguish between isomorphous and eutectic phase diagram.
5. Classify materials based on their electrical and magnetic properties.
6. Propose a solution to prevent corrosion.

Course Contents

Unit 1: Structure of solids:

Classification of engineering materials, Structure-property relationship in engineering materials, Crystalline and noncrystalline materials, Miller Indices, Crystal planes and directions, Determination of crystal structure using X-rays, Inorganic solids, Silicate structures and their applications. Defects; Point, line and surface defects.

Unit 2: Mechanical properties of materials:

Elastic, Anelastic and Viscoelastic behaviour, Engineering stress and engineering strain relationship, True stress - true strain relationship, review of mechanical properties, Plastic deformation by twinning and slip, Movement of dislocations, Critical shear stress, Strengthening mechanism, and Creep.

Unit 3: Equilibrium diagram:

Solids solutions and alloys, Gibbs phase rule, Unary and binary eutectic phase diagram, Examples and applications of phase diagrams like Iron - Iron carbide phase diagram.

Electrical and magnetic materials: Conducting and resistor materials, and their engineering application; Semiconducting materials, their properties and applications; Magnetic materials, Soft and hard magnetic materials and applications

Unit 4: Materials selection:

Overview of properties of engineering materials, Selection of materials for different engineering applications

UNIT 5: Tutorial & Assignment Work

Text Books:

1. W.D. Callister , *Materials Science and Engineering*; John Wiley & Sons, Singapore, 2002.
2. W.F. Smith, *Principles of Materials Science and Engineering: An Introduction*; Tata Mc-Graw Hill, 2008.
3. V. Raghavan, *Introduction to Materials Science and Engineering*; PHI, Delhi, 2005.

Reference Books:

1. S. O. Kasap, *Principles of Electronic Engineering Materials*; Tata Mc-Graw Hill, 2007.
2. L. H. Van Vlack, *Elements of Material Science and Engineering*; Thomas Press, India, 1998.
3. K. G. Budinski, *Engineering Materials – Properties and selection*, Prentice Hall India, 1996

RAC -221: Lab Course 4 (Based on RAC -211 & RAC -212)

Total Credits: 1.5	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

List of Practical

1. To study the basic concept of mechanical engineering.
2. To prove Boyles law gas equation
3. To study the first law of thermodynamics
4. To study the construction and working of steam engine
5. To study various power generation system
6. To determine Curie temperature of a ferrite sample and to study temperature dependence of permeability in the vicinity of Curie temperature
7. To study cooling curve of a binary alloy.
8. Determination of the elastic modulus and ultimate strength of a given fiber strand.
9. To determine the dielectric constant of a PCB laminate.
10. To investigate creep of a given wire at room temperature.
11. To estimate the band-gap energy of a semiconductor using four probe technique.
12. To measure grain size and study the effect of grain size on hardness of the given metallic specimens.

RAC -213: Engineering Graphics I

Total Credits: 2	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Learning Objectives:

1. To make use of drawing instruments effectively for drawing and dimensioning.
2. To understand the conventions and methods of engineering drawing.
3. To know the concept of projections of points, lines, planes, solids and section of solids.
4. To understand the Construction isometric and orthographic views of given objects.

Course Contents

Unit 1: Drawing Tools

Layout drawing sheets – drawing sheet, sizes information on drawing Sheets part list in case of sub-assemblies,
Drawing Instrument

Unit 2: Drawing standards and geometrical construction:

Drawing standard SP: 46, Type of lines, lettering, dimensioning, scaling conventions. Geometrical construction: Dividing a given straight line into any number of equal parts, bisecting a given angle, drawing a regular polygon given one side, special methods of constructing a pentagon and a hexagon.

Unit 3: Orthographic Projections and Projections of Points:

Introduction to orthographic projection, drawing of orthographic views of objects from their isometric views,
Projection of points lying in four quadrants

Unit 4: Test Tutorial, Assignments

Learning Outcomes:

Students will be able to:

1. Use of drawing instruments effectively for drawing and dimensioning.
2. Explain conventions and methods of engineering drawing.
3. Apply concept of projections of points, lines, planes, solids and section of solids.
4. Construct isometric and orthographic views of given objects

Reference/Text Books:

1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 46th Edition, 2003.
2. K. V. Natarajan, A text book of Engineering Graphic, Dhanalakshmi Publishers, Chennai, 2006.
3. K. Venugopal and V. Prabhu Raja, Engineering Graphics, New Age International (P) Ltd, 2008.
4. Dhananjay A. Jolhe, Engineering Drawing with an Introduction to Autocad, McGrawHill Education, 2017

RAC -214: Engineering Graphics II

Total Credits: 2	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Learning Objectives:

1. To make use of drawing instruments effectively for drawing and dimensioning.
2. To understand the conventions and methods of engineering drawing.
3. To know the concept of projections of points, lines, planes, solids and section of solids.
4. To understand the Construction isometric and orthographic views of given objects.

Course Content

Unit 1: Projections of Straight Lines and Planes and their Traces:

Projections of lines parallel and perpendicular to one or both planes, projections of lines inclined to one or both planes. Traces of lines, Projections of planes parallel and perpendicular to one or both planes, projection of planes inclined to one or both planes.

Unit 2: Projections of Solids

Types of solids, projections of solids with axis perpendicular and parallel to HP and VP, solids with axis inclined to one or both the planes, Projections of spheres touching each other.

Unit 3: Sectioning of Solids

Sectioning of solids: Section planes perpendicular to one plane and parallel or inclined to other plane

Unit 4: Isometric Projections

Isometric projections: Isometric scale, drawing of isometric projections from given orthographic views.

Unit 5: Test Tutorial, Assignments

Reference/Text Books:

5. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 46th Edition, 2003.
6. K. V. Natarajan, A text book of Engineering Graphic, Dhanalakshmi Publishers, Chennai, 2006.
7. K. Venugopal and V. Prabhu Raja, Engineering Graphics, New Age International (P) Ltd, 2008.
8. Dhananjay A. Jolhe, Engineering Drawing with an Introduction to Autocad, McGrawHill Education, 2017

Learning Outcomes:

Students will be able to:

5. Use of drawing instruments effectively for drawing and dimensioning.
6. Explain conventions and methods of engineering drawing.
7. Apply concept of projections of points, lines, planes, solids and section of solids.
8. Construct isometric and orthographic views of given objects

RAC 222: Lab Course 5 (Based on RAC -213 and RAC -214)

Total Credits: 1.5	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

List of Experiment

1. Lines, lettering and dimensioning.
2. Geometrical Constructions.
3. Orthographic projections.
4. Projections of points and straight lines
5. Projections of planes.
6. Projections of solids.
7. Section of solids.
8. Isometric Projections.

RAC -215: Engineering Mechanics I

Total Credits: 2	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Course Objectives:

1. To know and apply fundamental Laws of Engineering Mechanics
2. To know and apply Conditions of static equilibrium to analyze given force system
3. To compute Centre of gravity and Moment of Inertia of plane surfaces
4. To compute the motion characteristics of a body/particle for a Rectilinear and Curvilinear Motion
5. To know and discuss relation between force and motion characteristics

Course Contents

Unit 1: Basic Concepts

Objectives of Engineering Analysis and Design, Idealization of Engineering Problems, Simplification of real 3D problems to 2-D and 1-D domain, Basis of Assumptions, types of supports, types of load, free body diagram, Laws of Motion, Fundamental principles

Unit 2: Equilibrium

Static equilibrium, analytical and graphical conditions of equilibrium, Lami's theorem, equilibrium of coplanar concurrent forces, coplanar non concurrent forces, beams reactions Simple trusses (plane and space), method of joints for plane trusses, method of sections for plane trusses Friction: Coulomb law, friction angles, wedge friction, sliding friction and rolling resistance

Unit 3: Kinematics

Types of motions, kinematics of particles, rectilinear motion, constant and variable acceleration, relative motion, motion under gravity, study of motion diagrams, angular motion, tangential and radial acceleration, projectile motion

Unit 4: Tutorial & Assignment Work

Text Books

1. S. Timoshenko, D. H. Young, "Engineering Mechanics", McGraw Hill, 1995.
2. Tayal A. K., "Engineering Mechanics", Umesh Publications, 2010.
3. Bhavikatti S. S., Rajashekarappa K. G., "Engineering Mechanics", New Age International Publications, 2nd Edition.
4. Khurmi R. S., "Engineering Mechanics", S. Chand Publications, N. Delhi

RAC -216: Engineering Mechanics II

Total Credits: 2	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Course Contents

Unit 1: Basic Concept (8 Lectures)

Resolution and composition of a forces, Resultant, couple, moment, Varignon's theorem, force systems, Centroid of composite shapes, moment of inertia of planer sections and radius of gyration

Unit 2: Kinetics (10 Lectures)

Mass moment of inertia, kinetics of particle, D'Alembert's principle: applications in linear motion, kinetics of rigid bodies, applications in translation, applications in fixed axis rotation

Unit 3: Work, Power, Energy (10 Lectures)

Principle of virtual work, virtual displacements for particle and rigid bodies, work done by a force, spring, potential energy, kinetic energy of linear motion and rotation, work energy equation, conservation of energy, power, impulse momentum principle, collision of elastic bodies.

Unit 4: Tutorial & Assignment Work

Text Books

1. S. Timoshenko, D. H. Young, "Engineering Mechanics", McGraw Hill, 1995.
2. Tayal A. K., "Engineering Mechanics", Umesh Publications, 2010.
3. Bhavikatti S. S., Rajashekarappa K. G., "Engineering Mechanics", New Age International Publications, 2nd Edition.
4. McLean, Nelson, "Engineering Mechanics", Schaum's outline series, McGraw Hill Book Company, N. Delhi, Publication.
5. Khurmi R. S., "Engineering Mechanics", S. Chand Publications, N. Delhi

Course Outcomes:

Students will be able to:

1. Apply fundamental Laws of Engineering Mechanics
2. Apply Conditions of static equilibrium to analyze given force system
3. Compute Centre of gravity and Moment of Inertia of plane surfaces
4. Compute the motion characteristics of a body/particle for a Rectilinear and Curvilinear Motion
5. Know and discuss relation between force and motion characteristics

RAC -223: Lab Course 6 (Based on RAC -215 & RAC -216)

Total Credits: 1.5	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

At least 10 experiments should be performed from the following list

1. Polygon law of coplanar forces
2. Bell crank lever.
3. Support reaction for beam.
4. Problems on beam reaction by graphics statics method
5. Simple / compound pendulum.
6. Inclined plane (to determine coefficient of friction).
7. Collision of elastic bodies (Law of conservation of momentum).
8. Moment of Inertia of fly wheel.
9. Verification of law of Machine using Screw jack
10. Assignment based on graphics statics solutions
11. Any other innovative experiment relevant to Engineering Mechanics.
12. Centroid of irregular shaped bodies.
13. Verification of law of Machine using Worm and Worm Wheel
14. Verification of law of Machine using Single and Double Gear Crab.
15. Application of Spreadsheet Program for concepts like law of moments, beam reactions, problems in kinematics, etc

RAC-231 Communication Skills in English II

Total Credits : 3	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

I. Prose: 15 Marks

1. India's Message to the World- Swami Vivekananda
2. Are the Rich Happy? - Stephen Leacock
3. I Have a Dream- Martin Luther King Jr.
4. Going Public: A Man of Wealth and Fame- Walter Isaacson
5. Gold from the Grave- Anna Bhau Sathe

II. Poetry: 15 Marks

1. Stopping by Woods on a Snowy Evening- Robert Frost
2. Poem of Serpents- Loknath Yashwant
3. Strange Meeting- Wilfred Owen
4. The Ballad of the Landlord- Langston Hughes
5. The Tiger and the Deer- Sri Aurobindo

III. Grammar and Composition: 10 Marks

1. Basic Sentence Types: Declarative, Interrogative, Imperative, Exclamative
2. Affixation and Word Formation
3. Phrases and Idioms
4. Antonyms and Synonyms
5. Translation Skill (Marathi to English and vice versa)
 - a. Dialogue Writing
 - b. Blog Writing
 - c. Descriptive and Narrative Paragraphs
 - d. Preparing an Advertisement

IV. Internal Evaluation (Semester II): 10 Marks

1. PowerPoint Presentation on great/famous people, sportspersons, etc.
OR
2. Essay Writing/Review Writing on a book, film, well-known regional person, reformer, politician, social activist, etc.

Prescribed Textbook: *Elegance of Language II* by Board of Editors, BAMU
(Published by: Macmillan Publishers India, Private Ltd, 2021)

RAC-232 Marathi/Hindi

A student can opt any one of these subject (SL II)

Total Credits : 3	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Marathi

डॉ. ब.बासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद.

बी.ए./बी.एस्सी.प्रथम वर्ष सत्र दुसरे CBCS पध्दतीनुसार जून २०२२ पासून लागू

भारतीय भाषा : मराठी (भाग-२)

संकेतांक - AECC-2 Marathi

तासिका - ५७ तास - ४५ श्रेयांक - ०३ गुण - ५० (लेखी परीक्षा-४०, प्रात्यक्षिक -१०)

अ. क्र.	घटक	अभ्यासक्रमाचा तपशील	श्रेयांक	तास
१.	काव्य विभाग	१. या झोपडीत माझ्या - राष्ट्रसंत तुकडोजी महाराज २. प्रार्थना - कुसुमाग्रज ३. तुझ्या मताचे - वामनदादा कर्डक ४. सांगा कसं जगायचं ? - मंगेश पाडगावकर ५. आल्या जुळून तारा - सुहासिनी इलेंकर ६. समाधान - फ. म. शहाजिंदे ७. जीवनाचा शोध घेताना - वाहरू सोनवणे ८. शिकवण - नारायण कुलकर्णी कवठेकर ९. कळा सोसताना - जगदीश कदम १०. जीवाचा आटापिटा - लोकनाथ यशवंत ११. बाप म्हणायचा - इंद्रजित भालेराव १२. युद्ध - नीरजा	०१	१५
२.	गद्य विभाग	१. ज्ञात-अज्ञात अहिल्याबाई होळकर - विनया खडपेकर २. खोप - रा. रं. बोराडे ३. विनदरदी - भीमराव वाघचौरे		
	व उपयोजित मराठी	४. क्तोरोफिल - रेखा बैजल ५. निश्चल डोंगरगाव, प्रेमळ माणसं - बा.भो.शास्त्री ६. लॉरी बेकर - अतुल देऊळगावकर उपयोजित मराठी (०४ घटक)	१.५	२३
३.	प्रकल्प / प्रात्यक्षिक / स्वाध्याय	अध्यपकांनी विद्यार्थ्यांच्या कौशल्यांना उपयुक्त असे विषय प्रकल्प / प्रात्यक्षिक / स्वाध्यायाकरिता मार्गदर्शन करणे अपेक्षित आहे.	०.५	०७
		एकूण	०३	४५

Hindi

बी.ए./ बी. एस्सी./बी. कॉम./ बी.एफ. ए./ बी. एस. डब्ल्यू प्रथम वर्ष द्वितीय सत्र (SEM-II)
(द्वितीय भाषा)

प्रश्नपत्र - सामान्य हिन्दी

HIN SL - AECC-2

अंक 50

उद्देश्य :

साहित्य संवेदनाओं का विकास कराना।

हिन्दी कविता का सामान्य परिचय कराना।

कविता का रसास्वादन एवं सृजन क्षमता का विकास कराना।

भाषा कौशल का विकास कराना।

अध्ययन-अध्यापन पद्धति

1) व्याख्यान

(2) दृक-श्राव्य माध्यम

3) सेमिनार

4) चर्चासत्र

पाठ्यक्रम

अ) पद्य साहित्य (कविताएँ)

अंक 30

पाठ्यपुस्तक -

काव्य इन्द्रधनु - सम्पादक- हिन्दी अध्ययन मण्डल, वाणी प्रकाशन, नई दिल्ली

पाठ्यक्रम में समाविष्ट कविताएँ

1. अमीर खुसरो (5 पहेलियाँ) - 1. एक थाल मोतियों से भरा, 2. बीसों का सिर काट लिया, 3. तरवर से
इक तिरिया उतरी, 4. खड़ा भी लोटा पड़ा भी लोटा, 5. आदि काटे से सबको पारे

2. सन्त नामदेव (3 पद) - 1. जत्र जाऊँ तत्र बीठल मैला। 2. राम नाम की खेती राम नाम की बारी।

3. धृग ते बकला धृग ते सुरता

3. सन्त कबीर (5 दोहे) - 1. गुरु गोविन्द दोऊ खड़े 2. माटी कहे कुम्हार से 3. दुःख में सब सुमिरन करें

4. पाहन पूजे ते हरि मिलें 5. काँकर पाथर जोरी कै

4. मीराबाई (3 पद) - 1. मेरे तो गिरधर गोपाल 2. पायो जी मैं तो राम रतन धन पायो

3. हे री मैं तो प्रेम दिवानी

5. रहीम (5 दोहे) - 1. रहिमान जे नर उत्तम प्रकृति 2. पावस देखि रहीम मनः 3. रहिमान देखि बडेन को

4. बड़े बड़ाई ना करें 5. रहिमान या संसार में सबसे

6. भूषण (3 पद)

1. इन्द्र जिमि जम्भ पर वाडव 2. राखी हिन्दुवानी हिन्दुवान को तिलक राख्यौ 3. निकसत म्यान तैं मयूखें

7. अयोध्यासिंह उपाध्याय हरिऔध - कर्मवीर

8. माखनलाल चतुर्वेदी - पुष्प की अभिलाषा

9. मैथिलीशरण गुप्त - शिक्षा की अवस्था

10. सूर्यकान्त त्रिपाठी निराला - तोड़ती पत्थर

11. सुदामा पाण्डे धूमिल - रोटी और संसद

12. अटलबिहारी वाजपेयी - कदम मिलाकर चलना होगा

आ) हिन्दी भाषा

अंक 20

1) हिन्दी शब्द सम्पदा (तत्सम तद्भव, देशज, विदेशी, संकर, समानार्थी, विरुद्धार्थी, पर्यायवाची शब्द)

2) अशुद्धि शोधन

प्रोफेसर डॉ. शिबाजी सांगोले
अध्यक्ष
हिन्दी अभ्यास मंडळ (B.O.S)
डॉ. बाबासाहेब आंबेडकर मराठवाडा
विद्यापीठ, औरंगाबाद

3) संगणक एवं इंटरनेट में हिन्दी के अनुप्रयोग

(4) पत्रलेखन - निजी, सामाजिक, सरकारी, अर्ध सरकारी, ई मेल

सन्दर्भ ग्रन्थ :

- (1) आधुनिक हिन्दी कविता - विश्वनाथ प्रसाद तिवारी, लोकभारती प्रकाशन, इलाहाबाद
- (2) प्राचीन कवि - विश्वम्भर मानव लोकभारती प्रकाशन इलाहाबाद
- (3) आधुनिक कवि - विश्वम्भर मानव, रामकिशोर शर्मा, लोकभारती प्रकाशन, इलाहाबाद
- (4) आधुनिक कविता का पुनर्पाठ - करुणाशंकर उपाध्याय, राधाकृष्ण प्रकाशन, नई दिल्ली
- (5) कम्प्यूटर में भाषिक अनुप्रयोग - विजय कुमार मल्होत्रा, वाणी प्रकाशन, नई दिल्ली
- (6) व्यावहारिक हिन्दी व्याकरण - हरदेव बाहरी, लोकभारती प्रकाशन, इलाहाबाद
- (7) प्रयोजनमूलक हिन्दी - डॉ. माधव सोनटक्के, लोकभारती प्रकाशन, इलाहाबाद
- (8) व्यावहारिक हिन्दी व्याकरण - डॉ. माधव सोनटक्के, लोकभारती प्रकाशन, इलाहाबाद
- (9) प्रयोजनमूलक हिन्दी - डॉ. अंबादास देशमुख, शैलजा प्रकाशन, कानपुर

प्रश्नपत्र का प्रारूप एवं अंक विभाजन

द्वितीय सत्र (Sem - II)

प्रश्नपत्र - सामान्य हिन्दी

HIN SL - AECC-2

अंक- 50

लिखित परीक्षा - 40

अंतर्गत मूल्यांकन - 10

अंक : 40

सूचना:

1) पहला और दूसरा प्रश्न अनिवार्य है।

2) शेष प्रश्नों में से किन्हीं चार के उत्तर लिखने हैं।

3) कुल छह प्रश्न लिखने हैं।

4) दायीं ओर प्रश्नों के पूर्णांक दिये हैं।

प्र. 1 समग्र पाठ्यक्रम पर वस्तुनिष्ठ प्रश्न

10

(अ) रिक्त स्थानों की पूर्ति कीजिए।

(आ) एक वाक्य में उत्तर लिखिए।

प्र. 2 काव्य इन्द्रधनु पर विकल्प सहित ससन्दर्भ व्याख्या कीजिए। (अ + आ)

06

प्र. 3 काव्य इन्द्रधनु पर दीर्घोत्तरी प्रश्न

06

प्र. 4 काव्य इन्द्रधनु पर दीर्घोत्तरी प्रश्न

06

प्र. 5 काव्य इन्द्रधनु पर दीर्घोत्तरी प्रश्न

06

प्र. 6 "हिन्दी भाषा के पाठ्यक्रम पर दीर्घोत्तरी प्रश्न

06

प्र. 7 हिन्दी भाषा के पाठ्यक्रम पर दीर्घोत्तरी प्रश्न

06

प्र. 8 टिप्पणियाँ लिखिए।

06

अ) काव्य इन्द्रधनु पर विकल्प सहित टिप्पणी

आ) हिन्दी भाषा के पाठ्यक्रम पर विकल्प सहित टिप्पणी

अन्तर्गत मूल्यांकन परीक्षा 05 अंक सेमिनार (संगोष्ठी) - 05 अंक

नोट - अन्तर्गत मूल्यांकन में दो बार पांच-पांच अंको की लिखित परीक्षा लेनी है और जिसमें अधिकतम अंक प्राप्त होंगे उसे अन्तिम परिणाम के रूप में स्वीकृत करना है।

प्रोफेसर डॉ. शिवाजी सांगोळे

अध्यक्ष

हिन्दी अभ्यास मंडळ (B.O.S)

डॉ. बाबासाहेब आंबेडकर मराठवाडा

विद्यापीठ, अहमदाबाद

RAC-217 Constitution of India

Total Credits : 2* (Non Credit Course)	Contact Hours : 45 (3 /Week)
Marks: 50 (10 CA + 40 UA)	

Appendix - "A"

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

* COMPULSORY COURSE TO THE UNDER GRADUATE STUDENTS OF AFFILIATED
AND CONDUCTED COLLEGES OF UNIVERSITY

[Subject Code: IIC 001]

02 Credits

AN INTRODUCTION TO INDIAN CONSTITUTION

Unit I

1. Meaning and Concept of Indian Constitution
2. Nature of Constitution
3. Brief Idea of Indian Constitution
[Parts, Articles and Schedule]

Unit II

Silent Features of Indian Constitution

1. Written and Enacted Constitution; 2. The longest and most detailed Constitution of the World; 3. Rigidity and Flexible Constitution; 4. Parliamentary system of Government; 5. Federal system with unitary bias; 6. Adult Franchise; 7. Single Citizenship; 8. Sovereign, Democratic, Republic; 9. Secularism; 10. Directive Principles of State Policy; 11. Independent Judiciary; 12. Fundamental Rights; 13. Fundamental Duties.

Unit III

A. Fundamental Rights

1. Concept of State (Art. -12); 2. Right to Equality (Art. -14 to 18); 3. Right to Freedom (Art. -19 to 22); 4. Right against Exploitation (Art. -23 & 24); 5. Right to Religion (Art. -25 to 28); 6. Right of Minorities (Art. -29 & 30); 7. Constitutional Remedies (Art.-32).

B. Fundamental Duties (Art.-51 A)

Unit IV

Directive Principles of State Policy (DPSP's)

1. Meaning and Significance of Directive Principles.
2. Classification/ Principles of D.P.S.P.
3. Relationship between F.Rs. and D.P.S.P.

Unit V

Executives

A) Union Government

The President, Council of Ministers and Prime Minister.

B) State Government

The Governor, Council of Ministers and Chief Minister.

• **References**

1. Constitution of India, Bare Act. Govt. of India.
2. Subhash C Kashyap, Our Constitution (AN Introduction of Indian Constitution and Constitutional Law, National Book Trust, India 2001.
3. Avasthi & Maheshwari, Indian Constitution, Lakshmi Narain Agrawal Agra, 2017.
4. Basu D.D., Introduction to the Constitution of India, Lexis Nexis, 2013.
5. Sharma L.N. Indian Prime Minister, the Macmillan Company of India, 1976.
6. Jain H.M. Union Executive, Chaitanya Publishing House, 1969.
7. Dr. S.N. Busi, Dr. B.R. Ambedkar, Framing of Indian Constitution, 1st Edition, 2015.
8. M.P. Jain, Indian Constitution Law, 7th Edn., Nexis 2014.
9. M.P. Jain, Outlines of Indian Legal and Constitutional History, Lexis Nexis, 2014.
10. भारताचे संविधान.
11. प्रदिप गायकवाड, (संपादक) भारताचे संविधान शिल्पकार डॉ. बाबासाहेब आंबेडकर दिक्षाभूमी संदेश, नागपूर २००६.
12. ग्रॅनव्हिल ऑस्टिन, अनुवाद भारती केळकर भारताची राज्यघटना, राष्ट्राची कोणशिला, डायमंड पब्लिकेशन, पुणे २०१३.
13. डॉ. भा.ल. भोळे, भारताचे शासन आणि राजकारण, विद्या प्रकाशन, नागपूर.

Note: All latest volumes of above mentioned books must be preferred. The above list of books is not an exhaustive one.

Internal Test (45 Minutes)
Home Assignment
Theory Paper (02 Hours)

10 Marks
10 Marks
30 Marks

[1]	Section – [A]	Ten MCQ Carrying One Mark each	10 Marks
[2]	Section – [B]	Two Short Questions Carrying 5 Marks each Out of Five Questions Students have to Attempt any two	10 Marks
[3]	Section – [C]	One Long Question, Out of Three Questions Students have to attempt any one	10 Marks

**Note: - This Course is bilingual (English & Marathi)
The Examination will also be bilingual.**