

 Estd. 1962 "A++" Accredited by NAAC (2021) With CGPA 3.52	SHIVAJI UNIVERSITY, KOLHAPUR 416 004, MAHARASHTRA PHONE : EPABX - 2609000, BOS Section - 0231-2609094, 2609487 Web : www.unishivaji.ac.in Email: bos@unishivaji.ac.in शिवाजी विद्यापीठ, कोल्हापूर, ४१६ ००४, महाराष्ट्र दूरध्वनी - इपीबीएक्स - २०६०९०००, अभ्यासमंडळे विभाग : ०२३१- २६०९०९४, २६०९४८७ वेबसाईट : www.unishivaji.ac.in ईमेल : bos@unishivaji.ac.in	 
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Ref.: SU/BOS /Voc. / 222

Date: 06 - 07- 2026

The Principal,
 All concerned Affiliated Colleges /Institutions,
 Shivaji University, Kolhapur

**Subject : Regarding Syllabi of B. Voc. Part II Programme under the Faculty of
 Inter- Disciplinary Studies as per National Education Policy 2020 (2.0)**

Sir/Madam,

With reference to the subject, mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the syllabi of following B. Voc. Part II Programme under the Faculty of Inter-Disciplinary Studies, as per National Education Policy 2020 (2.0).

1	B. Voc. Food Processing Technology	6	B Voc. Tourism And Service Industry
2	B. Voc Sustainable Agriculture	7	B. Voc. Building Technology & Interior Designing
3	B. Voc. Automobile	8	B. Voc. Printing And Publishing
4	B. Voc. Graphic & Design	9	B. Voc. Nutrition And Dietetics
5	B. Voc. Nursing And Hospital Management	10	B. Voc. Sustainable Agriculture Management

This syllabus (nature of question paper and equivalence etc) shall be implemented from the academic year **2026-2027** onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in NEP-2020 (Online Syllabus).

The question papers on the pre-revised syllabi of above-mentioned programmes will be set for the examinations to be held in October /November 2026 & March/April 2027. These chances are available for repeater students, if any.

You are therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully



Dy Registrar

Encl. : as above

Copy to: For information and necessary action

1	The I/C Dean, Faculty of IDS	7	P.G.Admission Section
2	Director, Board of Examination and Evaluation	8	Affiliation T. 1 & T. 2 Section
3	The Chairman, Respective Board of Studies	9	Appointment A & B Section
4	All On Exam Section	10	P.G.Seminar Section
5	Eligibility Section	11	I. T. Cell
6	Computer Centre	12	Internal Quality Assurance Cell (IQAC)

SHIVAJI UNIVERSITY, KOLHAPUR



Accredited By NAAC with 'A++' Grade with CGPA 3.52

**Faculty of Inter
disciplinary Studies
Syllabus for
B.Voc.-Part II
NEP-2.0
Automobile**

**Revised Syllabus to be implemented from
Academic year 2026-2027 onwards**

(Subject to the modifications that will be made from time to time)

SHIVAJI UNIVERSITY, KOLHAPUR
Revised Syllabus for the Bachelor of Vocation in Automobile
(As per NEP- 2.0)
Applicable from the Academic Year 2026 – 27

1. **Title:** B. Voc. II Automobile Degree Programme, Shivaji University, Kolhapur Revised Syllabus as per NEP – 2.0
2. **Faculty:** Faculty of Food Processing Technology.
3. **Year of Implementation:** From June 2026
4. **Preamble (Automobile):** The Preamble for the Bachelor of Vocation (B.Voc) in Automobile is designed to align higher education with the emerging needs of the economy, addressing the shortage of skilled manpower in the automobile industry. It aims to bridge the gap between education and industry requirements by providing a mix of theoretical knowledge and hands-on, industry-specific skills

5. Program Outcomes:

- 1.**Technical Proficiency:** Apply knowledge of basic sciences, engineering, and technology to solve complex problems in automobile service and manufacturing.
- 2.**System Diagnosis & Repair:** Install, troubleshoot, and service automobile systems, including electrical vehicles, engines, and braking systems.
- 3.**Modern Tool Usage:** Utilize relevant tools, diagnostic equipment, and modern automotive technologies (e.g., VVT-i, Hybrid systems).
- 4.**Industry Compliance & Safety:** Adhere to health, safety, environmental, and legal standards in the automotive sector.
- 5.**Professional Development:** Develop skills for lifelong learning and adaptability to changing technological trends in the industry.
- 6.**Management & Communication:** Demonstrate effective leadership, team management, and communication skills within professional, multi-disciplinary teams.

6.Course Outcomes (CO):

- 1.**Technical Skills:** Students will demonstrate the ability to service, maintain, and repair automobile systems, including modern engine, electrical, and power train technologies.
- 2.**Diagnostics & Troubleshooting:** Ability to analyze and diagnose faults in vehicles using advanced tools and diagnostic equipment.
- 3.**Industry Application:** Graduates will be capable of applying knowledge of automotive manufacturing processes and repairing technology to real-world scenarios.
- 4.**Safety & Ethics:** Ability to operate within workshop standards, ensuring safety, environmental compliance, and ethical professional conduct.
- 5.**Professional Development:** Graduates can work effectively in teams, communicate in technical environments, and adapt to evolving automobile technologies.
- 7.**Duration of the Course:** The B. Voc. II Course (Automobile) (Level 5.0) will be of **Two Semesters (Sem. III and Sem IV).**

8. Medium of Instruction: English

9. Eligibility for Admission to B. Voc. Part II (Level 5.0):

- i. The students passing or ATKT the B. Voc. Part-I (or Undergraduate Certificate in Automobile)
 - ii. shall be allowed to enter upon the B. Voc. Part-II (or Undergraduate Diploma in Automobile).
- OR
- iii. An Examination of any other Statutory University or an examining Body recognized as equivalent there to.

Scheme of Teaching and Examination:

Each theory course paper constitutes of 4-5 units, which require 30 hours of teaching lectures and there shall be two lectures per theory (2 Cr) course per week.

B. Voc. II Automobile Course will be of 44 Credits (1100 marks).

Examination of each **theory course** shall be of **50 marks** (30 university examination + 20 internal assessment).

University examination of 30 marks (1.5 hours' duration) will be conducted at the end of each Semester.

Internal assessment of 20 marks will be done before the semester examination during each semester.

Examination for a practical course shall be 50 marks per semester.

Pattern and Nature, marking scheme for theory and

Practical Examination for Major Specific SEC and VSC courses are included in syllabus.

Question papers will be set in the view of the entire syllabus and preferably covering each unit of the syllabus.

Weightage should be provided for each unit as per the hours allotted for teaching.

Structure of course: Given in Framework Chart

Standard of Passing: The standard of passing shall be as per the following table.

	Semester End Exam	Internal Assessment	Course Exam (Total)
Maximum Marks	30	20	50
Minimum Marks required for passing	12	8	20

i. There shall be a separate head of passing for semester-end examination and internal examination.

ii. Minimum 20 marks out of 50 are required for passing of practical examination of each course.

iii. **Assessment:**

The NEP 2020 emphasizes upon formative and continuous assessment rather than summative assessment.

Therefore, the scheme of assessment should have components of these two types of assessments.

Assessment has to have correlations with the learning outcomes that are to be achieved by a student after completion of the course

- a) **Continuous Assessment:** Assignments, projects, presentations, seminars and quizzes
- b) **Examinations:** Midterm, finals, or comprehensive exams.
- c) **Research Projects/Dissertation/Thesis:** Evaluated through submission and viva-voce
- d) **Grading System:** Standardized letter grades, percentages, or CGPA

Letter Grades and Grade Points

The Semester Grade Point Average (SGPA) is computed from the grades as a measure of the student's performance in a given semester. The SGPA is based on the grades of the current term, while the Cumulative GPA (CGPA) is based on the

grades in all courses taken after joining the programme of study. The HEIs may also mention marks obtained in each course and a weighted average of marks based on marks obtained in all the semesters taken together for the benefit of students.

Computation of SGPA and CGPA:

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

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4
F (Fail)	0
Ab (Absent)	0

1. The SGPA is the ratio of the 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.

$$\text{SGPA (S}_i\text{)} = \frac{\sum (C_{ix}G_i)}{\sum C_i}$$

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.

2. The Cumulative Grade Point Average (CGPA) is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

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

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

4. Nature of Question paper and scheme of marking:

- Theory question paper: Maximum marks -30
- Total No. of questions – 3
- All questions are compulsory.
- Question No.1 is MCQ type (6 Marks).
- Question number 2 is long answer type question Carries 12 marks.
- Question number 3 is short answer type question carries 12 marks.

(Nature of question paper is provided at the end of syllabus.)

SHIVAJI UNIVERSITY, KOLHAPUR NEP 2.0: Credit Framework for B. Voc. Undergraduate (UG) Programme under Faculty of In B. Voc. Food Processing Technology								
Level	Semester	COURSES			OE	VSC/SEC	AEC/VEC/IKS	OJT/FP/CE CC/ RP
		Course –I	Course -II	Course -III			IKS	
4.5	I	DSC-I (2) DSC-II (2) DSC P-I (2)	DSC-I (2) DSC-II (2) DSC P-I (2)	DSC-I (2) DSC-II (2) DSC P-I (2)	OE -1 (T/P) (2)	-	IKS-I (2) Introduction to IKS	-
	II	DSC-III (2) DSC-IV (2) DSC P-II (2)	DSC – III (2) DSC-IV (2) DSC P-II (2)	DSC-III (2) DSC-IV (2) DSC P-II (2)	OE-2 (T/P) (2)	-	VEC-I (2) (Democracy, Election and constitution)	-
Credits		8(T)+4(P)= 12	8(T)+4(P)= 12	8(T)+4(P)=12	2+2 =4	-	2 + 2= 4	-
		MAJOR		MINOR				
5.0	III	Major-V (2) Major-VI (2) Major P-III (2)	-	Minor-V (2) Minor-VI (2) Minor P-III (2)	OE -3 (T/P) (2)	VSC- I (2) (P) (Major Specific) SEC-I (2) (T/P)	AEC-I (2) English	CC-I (2)
	IV	Major-VII (2) Major-VIII (2) Major P-IV (2)	-	Minor-VII (2) Minor-VIII (2) Minor P-IV (2)	OE-4 (T/P) (2)	SEC-II (2) (T/P)	AEC-II (2) English VEC-II (2) (Environmental Studies)	CEP-I (2)
Credits		8(T)+4(P)= 12	-	8(T)+4(P)=12	2+2= 4 (T/P)	4 (T/P) +2 (P)=6	2 + 4= 6	2 + 2= 4
5.5	V	Major-IX (2) Major-X (2) Major P-V (4)	Major-I(ELEC) (2) Major P-I (ELEC) (2)	-	OE-5 (T/P) (2)	VSC-II (2) (Major Specific) (P)	AEC-III (2) English	OJT (4)
	VI	Major-XI (2) Major-XII (2) Major P-VI (4)	Major-II (ELEC) (2) Major P-II (ELEC) (2)	-	-	VSC-III (2) (P) (Major Specific) SEC-III (2) (T/P)	AEC-III (2) English IKS-2(Major Specific) (2)	FP (2)
Credits		8 (T) + 8 (P) = 16	4 (T) + 4 (P) = 8	-	2 (T/P)	2 (T/P) +4 (P) = 6	2 + 4 = 6	4+2 = 6
Total Credits		40+20=60		24	10	12	16	10

Sr. No	Course	No. of Lectures		Name of subject
		T	P	
1.	AECC-CD	2	-	English - III
2.	DEC-C-I	2		Theory of Machines
3.	DEC-C-II	2	-	Thermodynamics
4.	DSC-C-I	2	-	Strength of Materials
5.	DSC-C-II	2	-	Manufacturing of Automotive Components
6.	DEC-PR	-	2	Thermodynamics lab
7.	DSC-PR	-	2	Machine shop I
8.	SEC-C-I	-	4	Machine Drawing and Auto Cad
9.	OE-III	2		SHOULD BE SELECTED FROM BASKET
10.	CC	2		-

Sr. No.	Course	No. of Lectures		Name of subject
		T	P	
1.	AECC-CD	2	2	English-IV
2.	DEC-C-I	2	2	Fluid Mechanics and Machines
3.	DEC-C-II	2	-	Heat Transfer
4.	DSC-C-I	2	-	Vehicle Body Engineering and Safety
5.	DSC-C-II	2	-	Elements of Machine Design
6.	DEC-PR	-	2	Fluid Mechanics and Machines
7.	DSC-PR	-	2	Heat Transfer
8.	SEC-C-I	-	2	Machine shop II
9.	OE-IV	-	2	SHOULD BE SELECTED FROM BASKET
10	VEC-II	2	-	Environment
11	CEP-I	2	-	-

• Student Contact Hrs Per week : 22 hrs	• Total marks for B.Voc. – Advanced Diploma :1100
• Theory and Practical Lectures :44 Minutes Each	• Total credits for B. Voc.- Advanced Diploma: 44
• AECC: Ability Enhancement Compulsory Course (Compulsory Environmental Science)	
• Practical workload will for batch of 20 students	
• Practical Examination will be conducted Semester wise for 50 Marks per course (subject).	
• DSC: Discipline Specific Core Course -	
• DEC: Discipline Specific Elective -	
• There shall be separate passing for theory and practical courses.	
• AECC & VEC Internal Evaluation should be do neat college or respective departmental level	
• Exit option after Level 6: Students can exit with Advance Diploma Course in Bachelor of Vocation with the completion of courses equal to minimum of 56 credits and also shall have to acquire additional CCC credits by successfully completing CCC-I and CCC-II courses which are assisted by Compulsory Civic Courses	
• SEC –C &SEC- Dare two parts of Vocational Advance Diploma Course-II.	

Eligibility:

Eligibility for Admission: For Advance Diploma: Diploma or equivalent in any related stream.

Eligibility for Faculty: 1)Post Graduate with NET / SET/ Ph.D. Or
2)Five Year Industry Experienced Personal
2)M.A.(English)with NET/ SET for Business Communication

Eligibility for Lab Assistant: Graduation with related field

Staffing Pattern: Teaching: Inthe1styearofB.Voc.–OneFullTime

Lab. Assistant: One C.H.B. for Business Communication
For 1st Year of B. Voc. – 1 Part Time
For 2nd and 3rd Year (Inclusive of 1st Year) of B. Voc. –1FullTime

Key Course Outcomes (COs) & Learning Objectives

Bachelor of Vocation (B. Voc.) Part II - Sem. III
Ability Enhancement Course (AECC-C)

Paper Title: English-III

Paper No:

Credits:02

Theory: 2lectures/week

Total Marks:40 (Theory30+ Internal 10)

Units Prescribed for Theory:

40 marks

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Bachelor of Vocation (B.Voc.) Part II-Sem. III
Discipline Specific Elective Course (DEC-I)
Paper Title: Theory of Machines

Paper No:

Theory: 2 lectures/week

Credits: 02

Total Marks: 50 (Theory)

- ----- **Course Outcomes:** The students will acquire knowledge of

1. **Basic Concept of Mechanisms**
2. **Gear Trains**
3. **Cams**
4. **Belts**
5. **Flywheel**
6. **Governors**

Content of syllabus:

Unit I: Links, kinematic pair (lower and higher), Kinematic chain, Mechanism, inversion, Types of constraints, Inversions of slider crank chain, Double slider crank chain, Four bar, Steering gear mechanisms, Analysis of Hooke's joint. (8... Hrs)

Unit II: Types of Gear trains - Simple, Compound, Reverted, Epicyclic gear train, Tabular method for finding the speeds of elements in epicyclic gear train, Torques in epicyclic gear train, Differential gearbox (...8...Hrs)

Unit III: Types of cam and followers, Profiles of cams for specified motion of different followers, Spring load on the follower, Jumping of follower. (...8... Hrs)

Unit IV: Types of belt drives, Calculation of power transmitted, Belt tension ratio, Actual tension in a running belt, Centrifugal and initial tension in belt, Slip and creep of belt (...7...Hrs)

Unit V: Flywheel - Concept, function and application of flywheel with the help of turning moment diagram for single cylinder 4- Stroke I. C. Engine (no Numerical); Coefficient of fluctuation of energy, Coefficient of fluctuation of speed and its significance (...7... Hrs)

Unit VI: Types of governors, Porter and Hartnell governor, Controlling force and stability of governor, Hunting, Sensitivity, Isochronism, Governor effort and power, Insensitiveness of governors. (...7... Hrs)

Books Recommended:(List of Minimum 5Books)

Note: (If any - such as

Text Books:

1. "Theory of Machines", Rattan S. S. Tata Mc GrawHill, 3rd Edition.
2. "Mechanism and Machine Theory", Rao, Dukkipati, New Age International, 2nd Edition.
3. "Theory of Machines", Dr. V. P. Singh, Dhanpat Rai Publications.
4. "Theory of Machines", Sadhu Singh, Pears on Education, 3rd Edition.
5. "Theory of Machines", Ballaney, Khanna Publication.
6. "Theory of Machines", R. K. Bansal, Laxmi Publications, 5th Edition.

Reference Books:

1. "Theory of Machines and Mechanisms" Shigley, Tata Mc Graw Hill.
2. "Theory of machines" Thomas Beven Pearson Education, 3rd Edition.
3. "Theory of Machines" Jagdishlal, Metropolitan Publication.
4. "Mechanisms and Dynamics of machines" J. Srinivas, SciTech Publication.
5. "Kinematics, Dynamics and Design of Machinery", Walidron, Wiley India Publication, 2nd Edition.
6. "Kinematics, Dynamics of Machinery", Wilson, saddler, Pearson Education.

(1. In theory examination, the weight age to numerical problems should not exceed 30%. 2. Students can use scientific calculators in theory examination.)

Bachelor of Vocation (B.Voc.) Part II -Sem.III
Discipline Specific Elective Course (DEC-II)

Paper Title: **Thermodynamics**

Paper No:
Theory: 02lectures/week (Theory)

Credits:02
Total Marks: 50

Course Outcomes: The students will acquire knowledge of

1. Fundamentals of Thermodynamics
2. Ideal Gases
3. Steam and Steam Boiler
4. Cooling Towers
5. Steam Turbines
6. Steam Condensers

Content of syllabus:

Unit I: Define fundamental concepts of Thermodynamics, Apply first

Law of thermodynamics to various thermodynamic devices, Apply second law of thermodynamic.

Concepts of pure substance, types of systems, properties of systems-Extensive and Intensive properties, processes and cycles, Quasi –static process, flow and non-flow process, Thermodynamic equilibrium, Point and path function. Work, Heat Transfer and Energy. Thermodynamic definition of work & heat, Difference between heat and work. Energy–Potential Energy, Kinetic Energy, Internal Energy, Flow Work, concepts of enthalpy & entropy. Laws of Thermodynamics- Zeroth Law, principle of law of conservation of energy First law of Thermodynamics, Second Law of Thermodynamics- Kelvin Planks, Clausius statements and their equivalence, Clausius in equality, Concept of perpetual motion machine of first and second kind (10. Hrs)

Unit II: Concept of Ideal gas - Charle's law, Boyle's law, Avogadro's law, equation of state, characteristic gas constant and universal gas constant. Ideal gas processes: -Isobaric, Isochoric, Isothermal, Isentropic, Poly tropic, and their representation on P-V and T-S diagram (...8...Hrs)

Unit III: Generation of steam at constant pressure with representation on various charts such as T-S, H-S. Properties of steam and use of steam table, Dryness fraction, Degree of super heat Vapor processes: - Constant pressure, constant volume, constant enthalpy, constant entropy process (numerical using Mollier chart), Rankine Cycle. Steam Boilers: - Classification, Construction and working of -Cochran, Babcock and Wilcox, La-mont and Loeffler boiler. Boiler draught. Indian Boiler Regulation (IBR) Boiler Mountings and accessories (...6..Hrs)

Unit IV: Cooling Towers. - Construction and working of forced, natural and induced draught cooling tower (...9... Hrs)

Unit V: Steam turbine: -

Classification of turbines, Construction and working of Impulse and Reaction turbine. Compounding of turbines and its types, Regenerative feed heating, bleeding of steam, governing & its types, losses in steam turbines (...7.. Hrs)

Unit VI: Dalton's law of partial pressure, function and classification of condensers, construction and working of surface condensers. Sources of air leakage and its effect, concept of condenser efficiency, vacuum efficiency (Simple numerical). (...8...Hrs)

Books Recommended: (List of Minimum 5 Books)

Note: (If any - such as) 1. "Thermal Engineering", Kumar and Vasandani, D. S. Publisher Metropolitan Book Co, Delhi, 3rd Edition. 2. "Thermal Engineering", Mathur and Mehta, Jain Bros. Publishers, Delhi, 3rd Edition. 3. "Thermal Engineering", Baloney P.L, Khanna Publishers, New Delhi, 27th Edition. 4. "Engineering Thermodynamics", P.K.Nag., Tata McGraw Hill, New Delhi, 4th Edition. 5. "Engineering Thermodynamics", D.P. Mishra, Cengage learning, 1st Edition 6. "Principles of Engineering Thermodynamics", Moran, Shapiro, Boettner, Wiley, 8th Edition 7. "Engineering Thermodynamics", Gupta and Prakash, Nemich and Sons, 2nd edition. 8. "Thermal Engineering", R. K. Rajput, Laxmi Publications, 3rd Edition. 9. "Steam and Gas Turbines", R. Yadav, CPH Allahabad, 2nd Edition, 2005. 10. "Thermal Engineering", M.M Rathod, Tata McGraw Hill Education Pvt.Ltd, 1st Edition, 2010

(1. In theory examination, the weightage to numerical problems should not exceed 30%.

2. Students can use scientific calculators in theory examination.)

Bachelor of Vocation (B.Voc.) Part II -Sem.III

Discipline Specific Core Course (DSC–C-I)

Paper Title: Manufacturing of Automotive

Component

Paper No:

Theory: 02lectures/week

Credits:02

TotalMarks:50 (Theory)

Course Outcomes: The students will acquire knowledge of

1. **Casting Processes:**
2. **Forming Processes:**
3. **Plastic Shaping:**
4. **Machine Tools for Metal Cutting I:**
5. **Welding:**
6. **Non conventional Machining:**

Content of syllabus:

Unit I: Foundry layouts and mechanization, casting as manufacturing Process, moulding machines and core making. Components of gating system, functions and importance of runners and risers, solidification control devices: chills, ceramics bricks, directional solidification Gravity and pressure die-casting-Centrifugal casting-Continuous casting Melting practices and Metallurgical control In Cupola furnace, oil/gas fired furnaces, Induction and Arc Furnace-Metal pouring Equipment 's, fettling and in section of casting (...10..Hrs)

Unit II: Rolling, Hot and cold Rolling, Rolling Mill Classification, Defects in Rolling, forging, Hand Forging Operations, Forging Machines (board Hammer, Air and Steam, Hydraulic Hammer) Open and Closed Die Forging, Defects in Forging Extrusion, Direct, Indirect, Tube , Impact and Hydraulic Extrusion, Defects Extrusion Drawing Types of Wire, rod and pipe drawing, Defects in Drawing. (...8.Hrs)

Unit III: Introduction to blow molding, injection molding, extrusion, calendaring and thermo forming (...6.. Hrs)

Unit IV: Introduction to lathe, Types of lathe, Working principle, types, specifications, principle parts, accessories, attachments, and various lathe operations, Capstan, turret lathe comparison with centre lathe, Turret in dexing mechanism ,Bar feeding mechanism, Turret tool holders. Introduction to Boring Machines-Horizontal and vertical boring machine, Construction and operation, Introduction to Drilling Machines-Classification of drilling machines, Construction and working. (...9..Hrs)

Unit V: Classification; Gas welding techniques ;Types of welding flames; Arc Welding –Principle, Equipment, Applications; Shielded metal arc welding ;Submerged arc welding; TIG/MIG welding;

Resistance welding-Spot welding, Seam welding, Projection welding; Welding defects; Brazing and soldering: Types, Principles, Applications. (...7.. Hrs)

Unit VI :Fundamental principle, machining unit, tool material, advantages, limitations and applications of Abrasive Jet Machining, Electrical Discharge machining, Electro-Chemical machining,Laserbeammachining,Ultrasonicismachining,Waterjetmachining (...8..Hrs)

Books Recommended: (List of Minimum 5 Books)

Note: (If any - such as)

- 1) “Elements of Workshop Technology Vol. II”, S.K. Hajra Choudhury, Media Promoters and Publishers, Mumbai.
- 2) “Text Book of Production Engineering” ,P.C. Sharma, S.ChandPublication,11thEdition.
- 3) “Machine Tool Engineering” G. R. Nagarpal, Khanna Publication.
- 4) “Principles of Modern Manufacturing” ,Groover, Wiley Publication., 5th Edition.

Reference Books:

- 1) “Production Technology”, HMT–Tata Mc Graw- Hill Publishing Ltd, .ISBN, 0070964432, 9780070964433. ,(2001).
 - 2) “Metal Cutting Theory and Tool design” Mr. Arshinnov, MIR Publication.
 - 3) “Fundamentals of Tool Design”ASTME, Prentice-Hall of India Private Ltd., New Delhi Publication, (1976).
 - 4) “Tool Design” ,Donaldson, THM Publication,3rd Edition.
 - 5) “Machine Tool Engineering”,G. R. Nagarpal, Khanna Publication.
 - 6) “Theory of Metal Cutting”, Sen and Bhattacharya,New Central Book Agency,(196
 - 7) “Production Engg. Design(Tool Design)”,S. Chandar and K. Surendra, Satya Prakash an, Delhi.
 - 8) “Production Tooling Equipment”, S. A.J. Parsan.
 - 9) “Jigsand Fixtures”,Kempster ,ELBS.
 - 10) “Metal Cutting and Machine Tools”, Thirupati Reddy ,Scitech Publication,1st Edition
 - 11) “Production Technology” ,Thirupati Reddy,Scitech Publication,1st Edition.
 - 12) “Principals of Metal Cutting”, C. K uppuswamy Sangam Books.
- “Fundamentals of Manufacturing Engineering”,D.K.Singh, Anes Book Pvt. Ltd.,2nd Revised Edition
- (1.Intheoryexamination,theweightage to numerical problems should not exceed30%. 2. Students can use scientific calculators in theory examination.)

Bachelor of Vocation (B.Voc.) Part II - Sem. III

Discipline Specific Core Course (DSC–C-II)

Paper Title: **Strength of Material**

Paper No:

Theory: 02 lectures/week

Credits:02

Total Marks: 50 (Theory)

Course Outcomes: The students will acquire knowledge of

1. **Mechanical Properties of Materials**
2. **Principal stresses and planes.**
3. **Bending Moment & Shear Force**
4. **Moment of Inertia**
5. **Bending Stresses**
6. **Direct and Bending Stresses**

Content of syllabus:

Unit I: Simple Stresses & Strains Specific Objectives. Acquire elementary knowledge of stresses, strains and material properties. Study and apply Euler's theory, Mechanical properties and Concept of Simple stresses & strains. Elasticity, Plasticity, Plastic flow, Ductility, Malleability, Stiffness & Strength. Types of loads, stresses -tensile, compressive, Shear, single & double shear, concept of plain strain –tensile, compressive, direct shear strain, torsional shear strain, lateral strain, Hooke's law, Poisson ratio common values for C.I.&M.S. Relation between stress - strain. Stress - strain diagram for tensile & brittle materials, important points on the stress-strain diagram, Modulus of elasticity & modulus of rigidity, Volumetric Strain, Bulk modulus, relation between modulus of elasticity & modulus of rigidity. Thermal stresses- Temperature stresses & strains of uniform section. Stress & strains in bars of stepped & uniformly varying sections subjected to axial load at ends only, composite sections having same length. 'Euler's theory, Rankine's theory (...10...Hrs)

Unit II: Specific Objectives. Acquire elementary knowledge of hoop stresses & principal stresses. Concept of Principal stresses and Principal planes. Stresses on an oblique section of a body subjected to

Direct stresses on one plane. Direct stresses on mutually perpendicular planes. Direct and Shear stress on one plane. Direct and Shear stress on mutually Perpendicular plane Mohr's circle method for finding principle stresses and planes. (...8..Hrs)

Unit III: Relation between rate of loading, shear force & bending moment. Shear force & bending moment diagrams for cantilevers, simply supported beam & overhanging beam subjected to point loads

uniformly distributed load. Location of point of contra flexure (...06..Hr)

Unit IV: Concept & definition of Moment of inertia, Parallel & perpendicular axes theorem. Moment of inertia of solid sections -square, rectangular, circular, semicircular, Triangular Hollow sections-square, rectangular & circular cross sections only. Moment of Inertia of angle section, Channel section, Tee-section, I section about centroidal axis & any other axis parallel to centroidal axis. Polar moment of inertia (...9.. Hrs)

Unit V

: Assumption in the theory of bending, moment of resistance, section modulus, neutral axis. Stress distribution diagram for Cantilever & simply supported beam. Equation of bending Concept of direct & transverse shear stress. Transverse Shear stress equation Shear stress distribution diagrams Average shear stress & Maximum shear stress for rectangular & circular section(...7.. Hrs)

Unit VI: Concept of Axial load, eccentric load, direct stresses, bending stresses, maximum & minimum stresses. Stress distribution diagram.

Problems on the above concepts for strut, machine parts such as offset links, C-clamp, Bench vice, Drilling machine frame etc. Condition for no tension in the section, core of section (...8..Hrs)

Books Recommended: (List of Minimum 5Books)

Note: (If any - such as

- 1) Gere and Timoshenko -Mechanics of material, CBS Publisher, 1984.
- 2) E.P. Popov- Introduction to Mechanics of Solids, Prentice Hall Publication.
- 3) Singer and Pytel –Strength of materials, Harper and row Publication.
- 4) Timoshenko and Young – Strength of materials, CBS Publication.
- 5) Beer and Johnston – Strength of materials, CBS Publication.
- 6) Shigley J. E. and Mischke C.R.–“Mechanical Engineering Design”– Mc Graw Hill Publication Co. Ltd.
- 7) Spotts M.F.and Shoup T.E.–“Design of Machine Elements”–Prentice Hall International.
- 8) Bhandari V.B.–“Design of Machine Elements”–Tata Mc Graw Hill Publication Co.Ltd.
- 9) Black P. H. and O. Eugene Adams–“Machine Design”–Mc Graw Hill Book Co. Inc.
- 10) PSG Design Data Book
- 11) S. S. Rattan Strength of material–Tata Mc Graw Hill Publication Co. Ltd.
- 12) Dr. R. K. Bansal Strength of material, Laxmi publication Pvt. Ltd., New Delhi
- 13) Ramamurtham, Strength of material, Dhanpatrai Publication.

(1.In theory examination, the weightage to numerical problems should not exceed30%.

2. Students can use scientific calculators in theory examination.)

Bachelor of Vocation (B. Voc.) Part II -Sem. III
Skill Enhancement Courses (SEC–C-I)

Paper Title: Computer Aided Drafting

Paper No:

Credits:04

Practical:4 lectures/week

Total Marks:50(Practical)

Course Outcomes: The students will acquire knowledge of

- 1.Modify commands
2. Use of layers in drawing
3. Use of layers in drawing
4. Basic command to draw 2-D

Pre requisites Note:(If Any-such as Knowledge of the topics in the theory papers.)

List of Practical's: (Minimum10)

- 1 Basic command to draw 2-D objects like line, point, circle, arc, ellipse, polygon, polyline, spline etc.
2. Edit Commands: Erase, extension, break, fillet, chamfer, trim, scale, etc
3. Commands like line type, Dimension, text style etc.
4. Viewing and other: Zoom, pan, mirror, rotate, move objects, arrange blocks, offset et c.
5. Hatching of sections.
6. Use of layers in drawing.
7. Plotting of drawing.
8. Introduction to 3-D -modelling– sketcher, part design, assembly and drafting work benches.
9. Modify commands, view port, UCS, etc.

Student Instructions:

Instructions for practical examination

1. Every student shall be given one problem each.
2. Oral shall be based on the problem solve in Auto CAD and the journal.

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Laboratory Requirements:

- 1.
- 2.

Bachelor of Vocation (B.Voc.) Part II -Sem. III
Discipline Specific Elective Course (DEC-I PR)

Paper Title **Thermodynamics Lab:**

Paper No:
Practical:02 lectures/week

Credits:02
Total Marks:50(Practical)

Course Outcomes: The students will acquire knowledge of

1. Water tube and fire tube boilers.
2. Boiler mountings, Accessories and steam calorimeters
3. Grease penetrometer
4. Flash and fire point of a lubricating oil
5. Steam power plant

Pre requisites Note: (If Any-such as Knowledge of the topics in the theory papers.)

List of Practical's : (Minimum10)

1. . Study and Demonstration of water tube and fire tube boilers.
2. Study and Demonstration of boiler mountings, Accessories and steam calorimeters
3. Study and Demonstration of condenser and study of cooling towers
4. Significance and relevance of lubrication properties and systems
5. Teston Grease penetrate meter and dropping point apparatus
6. Teston Carbon residue, Cloud and Pourpoint apparatus.
7. Teston Redwood viscometer and Aniline point apparatus.
8. Determination of flash and fire point of a lubricating oil
9. Study/ Trial on steam power plant
10. Report on industrial visit to steam power plant

Student Instructions:

1. .Four to five experiments shall be selected for practical examination.
2. The number of students for each practical setup would not be more than four students.

Laboratory Requirements:

- 1.
- 2.

Bachelor of Vocation (B. Voc.) Part II -Sem. III

Discipline Specific Core Course (DSC-I PR)

Paper Title: - **Machine Shop I**

PaperNo:252

Practical:02 lectures/week

Credits:02

Total Marks:50(Practical)

- ----- **Course Outcomes:** The students will acquire knowledge of

1. Step turning
2. Turning
- 3.,taperturning

Prerequisites Note:(If Any-such as Knowledge of the topics in the theory papers.)

List of Practical's: (Minimum10)

1. Turning, Plain turning, step turning, taper turning should be carried out on lathe machine
2. Boring
3. Drilling

Student Instructions:

1.

Note: For each component, at least one dimension should be monitored with in close tolerance.

Laboratory Requirements:

1.

2.

Nature of Practical Question Paper:

Bachelor of Vocation (B.Voc.) Part II -Sem. IV (Advanced Diploma)
Discipline Specific Elective Course (DEC-I)

Paper Title: **Fluid Mechanics and Machines**

Paper No:

Credits:02

Theory: 02 lectures/week

Total Marks: 50(Theory40+Internal10)

Course Outcomes: The students will acquire knowledge of

1. **Properties of Fluid and Fluid Pressure**
2. **Fluid Flow**
3. **Flow Through Pipes**
4. **Hydraulic Turbines**
5. **Pumps**
6. **Pumps**

Content of syllabus:

Unit I: Properties of Fluid-Density, Specific gravity ,Specific volume, Specific Weight, Dynamic viscosity, Kinematic viscosity, Surface tension, Capillarity, Vapor Pressure, Compressibility Fluid pressure, Pressure head, Pressure in tensity Concept of absolute vacuum, gauge pressure, atmospheric pressure, absolute pressure. Simple and differential manometers, Burden pressure gauge. Total pressure, center of pressure- regular surface forces on immersed bodies in liquid in horizontal, vertical and incline deposition (10..Hrs)

Unit II: State Bernoulli's theorem and apply it to venture meter, orifice and pitot tube. Types off lurid flows-Laminar, turbulent, steady, unsteady, uniform, Continuity equation, Bernoulli's the remnant uniform, rotational, irrotational. Construction of venture meter, principle of working, coefficient of discharge,

Derivation for discharge through venture meter. Construction of orifice meter, Principle of working, hydraulic coefficients. Derivation for discharge through Orifice meter Pitot tube–

Construction, Principle of Working
(8Hrs)

Unit III:

State laws of friction and list various losses in flow through pipes. Solve numerical on laws of friction and list various losses in flow through pipes. Laws of fluid friction (Laminar and turbulent) Darcy' equation and Chazy' situation for frictional losses Minor losses in fitting sand valves Hydraulic gradient line and total energy line Hydraulic power transmission through pipe (6Hrs)

Unit IV: Explain working principle of various hydraulic turbines.

Layout and features of hydroelectric power plant, surge tanks and its need. Classification of hydraulic turbines

And their applications. Construction and working principle of Pelton wheel, Francis and Kaplan turbine. Draft tubes–types and construction, Concept of cavitation in turbines, (9Hrs)

Unit V: Construction, principle of working, priming methods and Cavitation Types of casings and impellers. Manometric head, Work done, Manometric

efficiency, Overall efficiency, NPSH Performance Characteristics of Centrifugal pumps (7Hrs)

Unit VI: Construction, working and applications multistage pumps Submersible pumps and jet pump Construction, working principle and applications of single and double acting reciprocating pumps. Slip, Negative slip, Cavitations and separation. Use of Air Vessels. Indicator diagram with effect of acceleration head & frictional head. (8 Hrs)

Books Recommended:(List of Minimum 5 Books)

Note: (If any - such as

TEXT BOOKS:

1. “Fluid Mechanics’ .L. Kumar, S. Chand Publication. New Delhi, 2nd Edition, 2000
2. “Theory and Applications of machines” ,K. Subramanya,, Tata Mc Graw Hill Publication, 1993
3. “Fluid Mechanics’ . K. Bansal, Laxmi publications. New Delhi,1998.
4. “Fluid Mechanics and Hydraulic Machines”, Ramouthar,.
5. “Fluid mechanics and Hydraulic Machines”, Modi and Seth,.
6. “Fluid mechanics and Hydraulic Machinery”, R.K Rajput, Laxmi publishers.
7. “Fluid Mechanics’ . F. Dougl as, J. M. Gasiorek, J.A. Swaffied, Pears on Education,4thEddit ion.

REFERENCE BOOKS:

1. “Fluid Mechanics”, V. L. Streeter and E.B. Wylie, Tata Mc Graw Hill Pvt Ltd. New Delhi ,2nd Edition,1997
2. “Introduction to Fluid Mechanics”, Edward J.S haughnessy ,Oxford University press
3. “Mechanics of Fluid” ,Merle C. Potter, Prentis Hall of India, New Delhi,2nd Edition.
4. “Fluid Mechanics” ,Fox and Mc Donald, John Wiley and Sons, NewYork, 8th Edition.
5. “Fluid Mechanics”, Fraizini, Tata Mc Graw-Hill, New Delhi,4th Edition.
6. “Fluid Mechanics”, White, Tata Mc Graw-Hill,New Delhi,4th Edition
7. “Fluid Mechanics–Fundamentals and Application”, Y .A. Cengel, J .M .Cimbala, TMI,
8. “Fundamentals of Fluid Mechanics”, B. R. Munson, D .F. Young, T.H. Ok iishi Wiley India Pvt. Ltd
- 9.“Fluid Mechanics and Machinery”, C.S. Ojha,, Oxford University Press

(1.In theory examination, the weightage to numerical problems should not exceed30%.

2. Students can use scientific calculators in theory examination.)

Bachelor of Vocation (B.Voc.) Part II - Sem. IV (Advanced Diploma)
Discipline Specific Elective Course (DEC–II)
Paper Title: Heat Transfer

Paper No:
Theory: 02lectures/week

Credits:02
Total Marks:50 (Theory)

- ----- **Course Out comes:** The students will acquire knowledge of

1. **Heat Transfer**
2. **Condensation and Boiling:**
3. **Heat exchangers:**
4. **Conduction**
5. **Convection**
6. **Radiation**

Content of syllabus:

Unit I: Modes of heat transfer: - Conduction, convection and radiation. Conduction Fourier's law, thermal conductivity, conduction through cylinder, thermal resistance, and composite walls Radiation Thermal Radiation, Absorptivity, Transmissivity, Reflectivity, Emissivity, black and gray bodies, Stefan – Boltzmann law. (...08.. Hrs)

Unit II : Boiling heat transfer, types of boiling, pool boiling curve and forced boiling phenomenon, condensation heat transfer, film wise and drop wise condensation (No numerical treatment).(8Hrs)

Unit III : Classification and applications, heat exchanger analysis–LMTD for parallel and counter flow heat exchanger, effectiveness – NTU method for parallel and counter flow heat exchanger, introduction to cross flow heat exchanger, LMTD correction factor, Introduction to heat pipe ..(...8..Hrs)

Unit IV: Introduction and Basic Concepts. Application areas of heat transfer, Modes and Laws of heat transfer, Three-dimensional heat conduction equation in Cartesian coordinates and its simplified equations, thermal conductivity, thermal diffusivity. Heat conduction in plane wall, composite wall, composite cylinder, composite sphere, electrical analogy, concept of thermal resistance and conductance. (...7.. Hrs)

Unit V: Fundamentals of convection: Mechanism of natural and forced convection, local and average heat transfer coefficient, concept of velocity & thermal boundary layers. Forced convection, Natural Convection.

Unit VI: Thermal Radiation: Fundamental concepts of radiation, different laws of radiation, Radiation shape factor, Heat exchange by radiation between two black and diffuse Greyson faces, Radiation shields.

Books Recommended:(List of Minimum 5 Books)

Note: (If any - such as

Text Books:

1. "Heat Transfer. P. Holman, Tata Mc Graw Hill Book Company, New York, 2nd Edition.
2. "Fundamentals of Heat and Mass Transfer", R.C. Sachdeva, Willey Eastern Ltd.,
3. "A Text Book on Heat Transfer" ,Dr. S .Sukatmi, Orient Longman Publication Hyderabad.
4. "Heat and Mass Transfer", S.C. Arora and Soukouna Aradhana Rai and Sons, Delhi.
5. "Fundamentals of Heat and Mass Transfer",C. P. Kothandaraman.
6. "Heat and Mass Transferrer. Rajput, S. Chand and CompanyLtd.,NewDelhi.,5thEdition.
7. "Heat and Mass Transfer" ,Dr. D. S .Kumar, S. K. Kataria and Sons, Delhi.
8. "Heat Transfer. K. Nagatomo Graw hill Publishing Company Ltd., New Delhi.
9. "Heat and Mass Transfer" ,G.K Amraj, Raveendran, SciTech Publication.
10. "Heat Transfer", VCR ao, University press.
11. "Heat Transfer", Dr. S. N. Sapali, Techmach Publication Pune.
12. "Heat and Mass transfer", M. M .Rathod, Laxmi Publications.
13. "Heat Transfer", S.P. Venkateshan,AneBooksPvt.Ltd.,2ndEdition.

Reference Books:

1. "Heat Transfer–A Practical approach", Yunus. Arcangel ata Mc Graw Hill.
2. "Heat Transfer" Chapman., Tata Mc Graw Hill Book Company, New York.
"Fundamentals of Heat and Mass Transfer", Frank Pinacoteca, David Pewitt, Wisley India.

Bachelor of Vocation (B. Voc.) Part II -Sem. IV (Advanced Diploma)

Discipline Specific Core Course (DSC–D-I)

Paper Title: VEHICLE BODY ENGINEERING AND SAFETY

Paper No:

Credits:02

**Theory:02lectures/week
(Theory)**

Total Marks: 50

-----Course Outcomes: The students will acquire knowledge of

1. **Types of bodies**
2. **Vehicle Body Materials**
3. **Load distribution**
4. **Interior Arrangements in Vehicle**
5. **Safety features and Devices**
6. **Body repair, finishing and Painting**

Content of syllabus:

Unit I: Classification of coach work type, coach and bus body style, layout of cars, buses and coach with different seating and loading capacity, commercial vehicle types, Vans and Pick-ups. Term subsidizing body building construction, Angle of approach, Angle of departure, Ground clearance, Cross bearers, Floor longitudines, posts, seattrain, waist rail, contrail, Roof stick, Roof longitude, Rub rail, skirt rail, truss panel, wheeler structure, wheelarch, post diagonals, gussets (7 Hrs)

Unit II: Aluminum alloys, Steel, alloy steels, plastics, Metal matrix composites, structure and limbers - properties, glass reinforced plastics and high strength composites, thermoplastics, ABS and styrene's, load bearing plastics, semi rigid PUR foams and sandwich panel construction. (7Hrs)

Unit III: Type of body structures, Vehicle body stress analysis, vehicle weight distribution, Calculation of loading for static loading, Simmetrical, longitudinal loads, side loads, stress analysis of bus body structure under bending and torsion. (6. Hrs)

Unit IV: Introduction, Seating dimensions, Interior ergonomics, ergonomics system design, seat comfort, suspension seats, split frame seating, back passenger educes, dash board instruments, electronic displays, commercial vehicle cabin ergonomics, mechanical package layout, goods vehicle layout. Visibility, regulations, drivers' visibility, methods of improving visibility, Window winding and seat adjustment mechanisms. (6. Hrs)

Unit V:Utility and functions of GPS system for vehicle, Necessity and types of seat belts, Types of Air-Bags(dual stage ,side),Crash Sensors, Security Systems(Remote Key less entry anti theft system and Alarm System)(6. Hrs)

Unit VI: Denting and painting, Paints adhesives and their properties, corrosion and their prevention. (6.Hrs)

Books Recommended:(List of Minimum 5 Books)

Note: TEXT BOOKS:

1. Sydney Fpage, "Body Engineering" Chapman & Hall Ltd, London, 1956
2. "Giles J Pawlowski", Vehicle body engineering Business books limited, 1989
3. John Fenton, " Vehicle body layout and analysis" , Mechanical Engg. Publication , London.

REFERENCE BOOKS:

1. Hand book on vehicle body design–SAE publication
2. Automotive chassis by P.M. Heldt, Chilton & Co, 1970
3. Vehicle Safety 2002, Cornwell press, Townbridge, UK, ISBN 1356-1448.
4. Redesign of bus bodies–part I & part II–CIRT Pune (Report), 1983
5. Ed W. H. Hucho, Aerodynamics of Road Vehicles, 4th Edition, Butterworth's 1987
6. Striber- Risky A.J, Road Vehicle Aerodynamics, Pantech press, London 2nd Edition 1984
7. Rae W. H & Pope A, Low Speed Wind Tunnel Testing Wiley & Sons, USA 1984 out of print
8. Noel W. Murray, "when it comes to the Crunch: The Mechanics of the Car Collisions" (Body work maintenance and repair by Paul and Browne.

Bachelor of Vocation (B. Voc.) Part II -Sem. IV (Advanced Diploma)

Discipline Specific Core Course (DSC–D-II)

Paper Title: **Elements of machine design**

PaperNo:214
Theory:02lectures/week

Credits:02
TotalMarks:50 (Theory)

- ----- **Course Outcomes:** The students will acquire knowledge of

1. **Fundamentals of Machine Design**
2. **Design of Shaft,**
3. **Design of Pulley and Selection of Belts**
4. **Unit 4 Design of springs**
5. **Design of Keys, and Couplings**
6. **Statistical considerations in design**

Content of syllabus:

Unit I: Concept of Machine design, Types of loads, Factor of safety-its selection and significance, Review of the orris of elastic failure and their applications, Basic procedure of design of machine elements, Review and selection of various engineering material properties and I. S. coding for ferrous materials, Factors governing election of Engineering materials (8Hrs)

Unit II: Design of solid and hollow shafts, splined shafts, ASME code for shaft design (8Hrs)

Unit III: Design of Pulley-

Flat and V belt pulley, Selection off lit belt, V belt as per the standard manufacturer' scat algae, Introduction to Timing belts (8Hrs)

Unit IV: Types of springs and their applications, Styles of end, Design of Helical Compression Spring subjected to static loading. (8Hrs)

Unit V: Types and Design of Keys, Types of Couplings, Design of Muff, Rigid Coupling, flexible bus headpin type flanged coupling. (8Hrs)

Unit VI: Ergonomics and aesthetic sin design, statistic sin design, design for natural tolerances, statistic analysis, and mechanical reliability (8Hrs)

Books Recommended:(ListofMinimum5Books) Note:

(If any - such as

Text Books:

1. “Design of Machine Elements’. B. Bhandari, Tata Mc Graw Hill, 3rd Edition.
2. “A Text Book of Machine Design. S .Khurmi and J. K. Gupta.
3. “Mechanical Engineering Design. Shrigley, Tata Mc Graw Hill.
4. “Design of Machine Elements”, Sharma and Purohit, Prentice Hall of India.
5. “Design of Machine Elements II”, J.B .K .DeSando P.L.S. Murthy, Sapna Publishers, 2nd Edition.

Reference Books:

- 1) “Machine Design Integrated approach”, Robert .Norton, 5th Edition.
- 2) PSG Design Data Book

Bachelor of Vocation (B. Voc.) Part II -Sem. IV (Advanced Diploma)

Discipline Specific Elective Course (DEC-I PR)

Paper Title **Fluid Mechanics and Machines Lab**

Paper No:

Credits:02

Practical:02 lectures/week

Total Marks:50 (Practical)

Course Outcomes: The students will acquire knowledge of

1. Pressure Measuring Devices
2. Flow visualization
3. Determination of velocity profile
4. Loss of friction in

Prerequisites Note:(If Any-such as Knowledge of the topics in the theory papers.)

List of Practical's: (Minimum10)

1. Study and demonstration of Pressure Measuring Devices
2. Flow visualization by plotting of stream line (Heles haws apparatus)
3. Reynolds experiment.
4. Verification of Bernoulli's equation.
5. Calibration of venturimeter/Orifice- meter
6. Calibration of notches.
7. Orifice under steady and unsteady flow condition
8. Determination of velocity profile through circular pipes for laminar flow.
9. Determination of minor losses in pips-fittings
10. Determination of coefficient of friction in pipes of different materials.

Student Instructions:**Laboratory Requirements:**

- 1.
- 2.

Bachelor of Vocation (B. Voc.) Part II -Sem. IV (Advanced Diploma)

Discipline Specific Core Course (DSC-I PR)

Paper Title: **Heat Transfer Lab**

Paper No:

Credits:02

Practical:02 lectures/week

TotalMarks:50(Practical)

Course Outcomes: The students will acquire knowledge of

1Thermal Conductivity of metal rod

2Stefan Boltzmann Constant

3. Coefficient in Forced Convection

4. Study of pool boiling phenomenon

Prerequisites Note:(If Any-such as Knowledge of the topics in the theory papers.)

List of Practical's: (Minimum10)

1. Determination of Thermal Conductivity of metal rod
2. Determination of Thermal Conductivity of insulating powder
3. Determination of Thermal Conductivity of Composite wall
4. Determination of heat transfer coefficient in Natural Convection
5. Determination of heat transfer coefficient in Forced Convection
6. Determination of temperature distribution, fin efficiency in Natural/Forced Convection
7. Determination of Emissivity of a Test surface
8. Determination of Stefan Boltzmann Constant
9. Determination of effectiveness of heat exchanger
10. Study of pool boiling phenomenon and determination of critical heat flux
11. Determination of equivalent thermal conductivity of heat pipe

Student Instructions:

Laboratory Requirements:

1.

Bachelor of Vocation (B. Voc.) Part II -Sem. IV (Advanced Diploma)
Skill Enhancement Courses (SEC– D-I)
Paper Title: -Machine Shop (II)

Paper No:
Practical:02 lectures/week

Credits:02
Total Marks:50(Practical)

Course Outcomes: The students will acquire knowledge of

1. Milling,
2. Grinding.
3. Tapping,

Prerequisites Note:(If Any-such as Knowledge of the topic the theory papers.)

List of Practical's: (Minimum10)

- i) Milling,
- ii.) Shaping,
- iii). Grinding,
- iv) Tapping,
- v). Slotting

Student Instructions:

Note: For each component, at least one dimension should be monitored within close tolerance.

Laboratory Requirements:

- 1.
- 2.

B. Voc. Part- II Semester–IV
Value Education Courses (VEC—II)

Paper Title: Environmental Science

Paper No:

Time: 3 hours

Total Marks: 70

Q.1 Do as directed. Question it Emson	10
Unit 1 to be asked. (10 out of 12)	
Q.2 Write a letter of application.	20
OR	
Draft a CV/Resume for a particular post.	
Q.3 Present a given information or data using a table/chart/pie diagram. (Any one diagram to be drawn.)	20
Q. 4 Fill in the blanks in the given interview.	20

Project Evaluation: 30 Marks

Or a Land Presentation based on the units prescribed.

Note:

The above structure is designed as per the guide lines of NSQF and NEP. The structure may be flexible for B. Voc.-II courses as per their requirements.

B. Voc Part II Semester -IV

Open Elective (OE)

Paper Title: SHOULD BE SELECTED FROM BASKET

B. Voc Part II Semester -IV
Community Engagement Practice (CEP)
Paper Title: SHOULD BE SELECTED FROM BASKET

B. Voc. II Syllabus (NEP-2.0)

To be implemented from June 2026 onwards Semester – III & IV

Nature of a Question Paper

Time: 1 hours

Total Marks: 30

Solve questions from the following.

Q. 1 Multiple choice Question

06 Marks

- i.
- ii.
- iii.
- iv.
- v.
- vi.

Q. 2 Long answer Question (Any Two out of three)

12 Marks

- i.
- ii.
- iii.

Q. 3 Short Answer Questions (Any Four out of six)

12 Marks

- i.
- ii.
- iii.
- iv.
- v.
- vi.

Internal Assessment

20 Marks

- ☐ Home Assignment
- ☐ Class Assignment (Tutorial Type)
- ☐ Quiz
- ☐ Mid-Term Test

Nature of Practical Question Paper:

Internal practical examination

50 marks

1. Group I

20 Marks

2. Group II

20 Marks

3. Submission of Certified Journal

10 Marks

Date:12/02/2026

To,
The Registrar
Shivaji University, Kolhapur

Subject: **Submission of B.Voc. – II Year Advanced Diploma structure as per NEP guidelines**

Dear Sir,

I'm submitting here with First Year **Bachelor of Vocation (B.Voc.-II) –Advanced Diploma** Course structure (LEVEL-6) to be implemented from Academic Year 2026-27.

Kindly accept it and acknowledge.

Thanking You,

Yours Faithfully,

(BOS Chairman- IDS)