CONTENTS

T24: Diploma in Mechanical Engineering

Basic Information

1. **Mode of Education**: Full time face-to-face mode enhanced with ELearning support.
2. **Minimum Programme Duration**: 4 years after SSC (10^{th})
3. **Required Study Efforts**: 600 Hours in **each** semester
4. **Medium of Instruction**: English
5. **Attendance**: Minimum 80% attendance for all courses.
6. **Equivalence Status**:
    a. UGC recognized and approved
    b. DEC recognized and approved
    c. MSBTE Equivalent (Renewal in Process)
    d. Recognized by Government of Maharashtra for MPSC jobs

Programme Calendar

SN	Activity Description	Odd semesters like 01, 03, 05 and 07 From 01-Aug Till 31 Jan	Even semesters like 02, 04, 06 and 08 From 01-Feb Till 31-Jul
Admission			
01	Further Admission	From 05-Jun Till 05-Jul	From 05-Dec Till 05-Jan
02	Fresh Admission	From 05-Jun Till 05-Aug	Not Offered
Teaching - Learning			
03	Teaching - Learning	From 01-Aug Till 13 Nov	From 01-Feb Till 16-May
04	Teaching–Learning Backlog Clearing	From 14-Nov to 04-Dec	From 17-May to 04-Jun
End Exam (EE) Form Submission			
05	EE Form Submission by students at SC	On or Before 30-Sep	On or Before 31-Mar
06	EE Form Submission by SCs at University	On or Before 05-Oct	On or Before 05-Apr
Continuous Assessment (CA) Submission			
07	CA Availability on website	From 01-Aug Till 30 Nov	From 01-Feb Till 30-May
08	CA Submission by Students at SC	01-30 Nov	01-30 May
09	Provisional CA Report by SCs	On or before 31-Dec	On or before 30-Jun
10	Final CA Report Submission by SCs at University	On or before 31-Jan	On or before 31-Jul
End Examination (EE)			
11	EE for Theory Courses	From 05-Dec Till 14-Dec	From 05-Jun Till 14-Jun
12	EE for Practical, STW, SV or PW Courses	Immediately after the last day of end exam for theory courses, but positively before 05-Jan	Immediately after the last day of end exam for theory courses, but positively before 05-Jul
Semester End Vacation			
13	Semester End Vacation	From 08-Jan Till 31-Jan	From 08-Jul Till 31-Jul

ELIGIBILITY AND FEES

<table>
<tr><th>Admission Eligibility</th><th>Certification Eligibility</th><th>Fees and Deposit / Semester</th></tr>
<tr>
<td>1. SSC (10th) or Equivalent Exam passed from recognized board</td>
<td>Min 50% or better marks in total 40 courses (subjects) of total 160 credit points at Semesters 01-08

Aggregate performance and Class in the programme shall be reported on the basis of only semesters 06 and 08.

Only for Earn and Learn Scheme Students
• Non Reporting Semesters (NRS): 01 to 05 and 07
• Reporting Semesters (RS): 06 and 08</td>
<td>
<table>
<tr><th>Desc</th><th>INR</th><th>USD</th></tr>
<tr><td>UF</td><td>1,500</td><td>150</td></tr>
<tr><td>SCF</td><td>5,600</td><td>560</td></tr>
<tr><td>ASF</td><td>1,000</td><td>100</td></tr>
<tr><td>EF</td><td>130/T
300/P
300/PW</td><td>13/T 30/P
30/PW</td></tr>
<tr><td>Total ≈</td><td>8,920</td><td>892</td></tr>
<tr><td>LD</td><td>2,000</td><td>200</td></tr>
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Only for Earn and Learn Scheme Students
<table>
<tr><th>Desc</th><th colspan="2">INR</th></tr>
<tr><td>UF</td><td colspan="2">1,500</td></tr>
<tr><td>SCF</td><td colspan="2">0</td></tr>
<tr><td>ASF</td><td colspan="2">0</td></tr>
<tr><td>EF (Only for Sem 06 and 07)</td><td colspan="2">130/T
300/P
300/PW</td></tr>
<tr><td rowspan="3">EF (Only for Sem 01 - 05)</td><td>University EE Fee/ semester</td><td>Study Center EE Fee/ semester</td></tr>
<tr><td>Rs 65/T</td><td>Rs 65/T</td></tr>
<tr><td>Rs 75/P
Rs 75/PW</td><td>Rs 225/P
Rs 225/PW</td></tr>
<tr><td>Total ≈</td><td colspan="2">2,320</td></tr>
<tr><td>LD</td><td colspan="2">2,000</td></tr>
</table>
</td>
</tr>
</table>

SEMESTERS AND COURSES

SN	Code	Name	CA	EE	TM	Type	CPs
Semester 01: 20 CPs, Common for all Specializations of Diplomas							
01	TML011	Applied Physics	20	80	100	T	4
02	TML012	Applied Mathematics-1	20	80	100	T	4
03	TML013	Self-Study Skills	20	80	100	T	4
04	TML014	Technical Communication	20	80	100	T	4
05	TML015	Computer Fundamentals	20	80	100	P	4
Semester 02: 20 CPs, Common for all Specializations of Diplomas							
06	TML021	Engineering Drawing-1	20	80	100	T	4
07	TML022	Applied Mathematics-2	20	80	100	T	4
08	TML023	Engineering Drawing-2	20	80	100	T	4
09	TML024	Machine Drawing	20	80	100	T	4
10	TML025	Engineering and Machine Drawing	20	80	100	P	4
Semester 03: 20 CPs, Common for all Specializations of Diplomas							
11	TML031	Basic Electrical Engineering	20	80	100	T	4

SN	Code	Name	CA	EE	TM	Type	CPs
12	TML032	Applied Chemistry	20	80	100	T	4
13	TML033	Basic Electronics	20	80	100	T	4
14	TML034	Electric Machines	20	80	100	T	4
15	TML035	Electrical and Electronics	20	80	100	P	4
Semester 04: 20 CPs, Common for all Specializations of Diplomas							
16	TML041	Engineering Mechanics-1	20	80	100	T	4
17	M07042	Production Technology 1	20	80	100	T	4
18	M07043	Production Technology 2	20	80	100	T	4
19	M07044	Special Manufacturing Processes	20	80	100	T	4
20	TML045	Production Technology	20	80	100	P	4
Semester 05: 20 CPs, Common for all Specializations of Diplomas							
21	M07051	Strength of Material	20	80	100	T	4
22	TML052	Engineering Mechanics-2	20	80	100	T	4
23	TML053	Fluid Mechanics	20	80	100	T	4
24	TML054	Hydraulic Machines	20	80	100	T	4
25	TML055	Fluid Mechanics and Hydraulic Machines	20	80	100	P	4
Semester 06: 20 CPs, Common for all Specializations of Diplomas							
26	TML061	Management Science	20	80	100	T	4
27	TML062	Entrepreneurship Development	20	80	100	T	4
28	TML063	Engineering Materials-1	20	80	100	T	4
29	TML064	Engineering Materials-2	20	80	100	T	4
30	TML065	Diploma Project Work-1	20	80	100	P	4
Semester 07: 20 CPs							
31	M07071	Mechanical Measurements	20	80	100	T	4
32	TML072	Basic Thermodynamics	20	80	100	T	4
33	TML073	Machine Design	20	80	100	T	4
34	TML074	Theory of Machines	20	80	100	T	4
35	TML075	Machine Design and Theory of Machines	20	80	100	P	4
Semester 08: 20 CPs							
36	TML101	Automobile Engineering-1	20	80	100	T	4
37	TML102	Automobile Engineering-2	20	80	100	T	4
38	TML103	Automobile Engineering-3	20	80	100	T	4
39	TML104	Automobile Engineering-4	20	80	100	T	4
40	TML105	Automobile Engineering-1	20	80	100	P	4

EVALUATION PATTERN

SN	Type of Course	Continuous Assessment	End Examination
1	Theory (T)	1. Student is required to answer 1 of 1 SAQ, each of 5 marks, on **each** CP **2. Single attempt only** **3. Marks**: 20 Marks **4. Duration:** Specified 1 Month	1. Student is required to answer 1 of 1 SAQ, **each** of 5 marks, on **each** CP 2. Student is required to answer 1 of 2 LAQs, **each** of 15 marks, on **each** CP **3. Maximum 5 Attempts only** 4. **Marks**: 80 Marks 5. **Duration**: 180 minutes

SN	Type of Course	Continuous Assessment	End Examination
2	Practical	1. Student is required to submit "Activity Report in Work-Book Format" for **each** CP in the prescribed format. 2. **Single Attempt only** **3.** **Marks**: 20 Marks 4. **Duration**: Specified 1 Month	1. External and internal examiners shall assess each student based on: a. Continuous Assessment submission by the student (Only by **External Examiner**) [20 Marks] b. Practical Activity performed by the student [40 Marks] c. Viva on Practical Activities [20 Marks] 2. **Maximum 5 Attempts only** 3. **Marks**: 80 Marks 4. **Duration**: 180 minutes
3	Project Work (PW)	1. Student is required to submit "Activity Report in Project Report Format" for **each** CP in the prescribed format. 2. **Single Attempt only** 3. **Marks**: 20 Marks 4. **Duration**: Specified 1 Month	1. **External** and internal examiners shall assess each student based on: a. Project Report submission by the student (Only by **External Examiner**) [20 Marks] b. Project Presentation by the student [30 Marks] c. Viva on Project Report[30 Marks] 2. **Maximum 5 Attempts only** 3. **Marks**: 80 Marks 4. **Duration**: 180 minutes

Actual CA and EE marks shall be used in computation of "Total Marks (TM)". "Grace Factor" and "Total Marks (TM)" shall be used in computation of Percentile marks. Only percentile marks shall be reported for each course in the mark-statement. Only best of the past performance shall be reported.

RECOGNIZED STUDY CENTERS

SN	SC Contact Info	SC Ref	SIT	Code	SC Staff Contact Info
1. Amaravati Region					
	No Study Centers	SC Ref	SIT	Code	
2. Aurangabad Region					
01	Marathwada Institute of Technology, P.B. No. 327, Beed Bypass Road, Aurangabad – 431005 Ph (W): (0240) 2376815 / 2377284 Fax (W): (0240) 2376154 Email: mit@mitindia.net Web Site: www.mitindia.net/ www.mitindia.org	2-T24-001	120	2107A	**SCH**: Prof. Munish Sharma **M**: +91-9422202202 **PC**: Prof. M.A.Patil **M**: +91-9325213062

02	College of Engineering, Tuljapur Road, Osmanabad – 413 501 Ph (W): (02472) 251712 Fax (W): (02472) 251011 Email: principal.coeo@yahoo.com Web Site: www.coeosmanabad.com	2-T24-002	30	2613A	**SCH**: P.S. Kolhe **M**: +91-9890668949 **PC**: Ambulgekar **M**: +91-9860366220
03	Nath Polytechnic, Paithan Pandurang Social Educational Trust, MIDC, Paidhan- 431128 Dist Aurangabad ph : 9011770138, 9890447248 fax : (02431) 32163 Email: rameshwar2380@yahoo.co.in	2-T24-003	30	21162	**SCH**: Riyad Ahmed Hashmi **M**: +91- **PC**: Vilas V Thote **M**: +91-9011770138
	3. Kolhapur Region				
01	Dr. J. J. Magdum College of Engineering New Building, Shirolwadi Road, Jaysingpur, Dist. Kolhapur, Pin – 416 101. Ph (W): (02322) 221825 / 221827 Fax (W): 27083 Web Site: www.jjmcoe.org	3-T24-001	60	7117A	**SCH**: J.J. Magdum **M**: +91-9421038723, (02322)21825 **PC**: S.R. Mahadik **M**: +91-(02322)21825
02	Rajarambapu Institute of Technology Rajaramnagar, Sakharale (Islampur), Tal. Walwa, Dist Sangli – 415 414 Ph (W): (02342) 220329, 221001 Fax (W): 220989 Email: san_ritech@sancharnet.in Web Site: www.ritindia.edu	3-T24-002	60	7209A	**SCH**: Mrs. S.S. Kulkarni **M**: +91-9970700700 **PC**: M.S. Kumbar **M**: +91-9970700741
03	Padmabhushan Vasantraodada Patil Institute of Technology, Budhagaon, Tal. Miraj, Dist. Sangli – 416 304 Ph (W): (0233) 2366245, 2366246 Fax (W): 2366185 Email: pvpitsangali@gmail.com Web Site: www.pvpitsangali.org	3-T24-003	30	7231A	**SCH**: A.M. Patil **M**: +91-9422613035 **Email:** patilavi_karnal@yahoo.co.in **PC**: S S Patil **M**: +91-9860857834
04	Institute of Civil and Rural Engineering Murlidhar Nagar, Gargoti, Tal- Bjudargad, Dist–Kolhapur416209 Ph (W): (02324) 220069 Fax (W): 02324 220249 Email : kpr_icre@sancharnet.in Web : smvircregargoti.org	3-T24-004	30	71151	**SCH**: J.S. Ghavade **M**: +91-9422627392 **Email: jayantghevade31@rediffi mail.com** **PC**: O. A. Jarali **M**: +91-9765026379
	4. Mumbai Region				

01	Shreeram Polytechnic, Sector-3, CIDCO Colony, Airoli, Navi Mumbai 400 708 Ph (W): 27692854/1662/7130 Fax (W): 2769 1665 Email: sppolyairoli@sify.com/ sppoly@mtnl.net.in Web Site: sppoly@edu.com	4-T24-001	120	3307A	**SCH**: Mr. Adokar 986925885 **PC**: Johnson Mathew **M**: +91-9324872886
02	B.L.Patil Polyetechnic, Near Khopoli Police Station, Khopoli, Dist. Raigad – 410 203 Ph (W): (02192) 263575, 266457 Fax (W): (02192) 263575, 268624 Email:ktspkpk@rediffimail.com Website: bipatilpolyetechnic.com	4-T24-002	30	3247A	**SCH**: Deshmukh B.N **M**: +91-9423378584 **PC**: Murade S.L. **M/P**:+91-9422494788 (02192)268624
03	K. J. Somaiya Polytechnic, Vidyanagar, Vidyavihar, Mumbai Ph (W): (022) 25161752, 25093443 Fax (W): (022) 25124408 Email:kjsp@vsnl.com Web Site: www.somaiya.edu	4-T24-003	60	31177	**SCH**: Mrs.B.Padmaja **M/P**:+91-(022)21021752 **PC**: Mrs. Motling Barnali S **M**: +91-9833570782
	5. Nagpur Region				
01	Shri Datta Meghe Polytechnic, YCCE Campus, Wanadongi Hingana Road, Nagpur 441 110 Ph (W): (0712) 2238893 / 2221959 Fax (W): 2221959 Email: nag_sdmp@hotmail.com Web Site: sdmpoly.com	5-T24-001	60	4494A	**SCH**: Shri Charde **M**: +91-9373101709 **PC**: Prof P.W. Raut **M**: +91-9822942801
02	Chandrapur Polytechnic, Balaji Ward, Chandrapur – 442 402 Ph (W): 253180 / 250540 Fax (W): 07172 257173 Email: principal@sarvodaymm.org Website: www.sarvodaymm.org/cpc	5-T24-002	30	4237A	**SCH**: Mr Harinkhere **M**: +91-9890787765 **Email:** nisalcpc@gmail.com **PC**: Mr. Nisal R.G. **M**: +91-9423416532
03	Smt. Radhikatai Pandav College of Engineering, Near Dighori Naka, Umrer Road, Nagpur – 411 204 Ph (W): (0712) 2712965, 2712696 / 276189 / 276190 Fax (W): 2712965 / 2710045 Email: smtrpce@hotmail.com Web Site: www.rpce.org	5-T24-003	30	44134	**SCH**: Pandharipande **M**: +91-9923103600 **PC**: A.H. Ingle **M**: +91-9960799424
04	G.H. Raisoni College of Engineering CRPF Gate No. 3, Hingana Road, Digdoh, Nagpur – 440 016 PH (W): (07104) 2352220, 236383 Fax (W): 07104- 232560	5-T24-004	60	44162	**SCH**: Bankatlal Jajoo **M**: +91- 09850350528 **PC**: Asutkar G.M. **M**: +91- 09423410288
	6. Nanded Region				

01	Gramin Polytechnic, Vishnupuri, Nanded – 431 606 Ph (W): (02462) 229801, 229555 Fax (W): 02462 229777 Email: principalgraminpolynanded@gmail.com Website: www.graminnanded.org	6-T24-001	30	8567A	**SCH**: Pawar V.S. **M**: +91- 9422 171151 **PC**: Miss. More J.B. **M**: +91- 97662484480
	7. Nasik Region				
01	Shri Sant Gadge Baba College of Engineering & Technology, Near Z.T.C., Bhusawal, Dist. Jalgaon, Ph (W): (02582) 224364, 221719-20 Fax (W): 02582 222889 Email: ssgbcoet123@gmail.com Web Site: ssgbcoet.com	7-T24-001	30	5391A	**SCH**: R.P. Singh **M**: +91-9823092665 **Email:** Girish227252@rediffmail.com **PC**: Tiwari R.B. **M**: +91-9822551558
02	K K Wagh College of Engineering, Amrut Dham, Panchavati, Nashik – 422 003 Ph (W): 2512876 / 2516671 Fax (W): 2511962 Emai l: kkwcoe_nsk@sancharnet.in Web Site: kkwagh.org	7-T24-002 (Confirm Admission availability with Programme Coordinator PC)	60	5414A	**SCH**: Nandurkar **M**: +91-(0253)2512876 **PC**: Murugkar **M**: +91-(0253)2512876
03	NDMVP Samaj's College of Engineering Udojimaratha Boarding Campus, Gangapur Road, Nashik – 422 013 Ph (W): (0253) 2571439 Fax (W): 2317016 Web Site: mvpce.ac.in	7-T24-003 (Confirm Admission availability with Programme Coordinator PC)	60	54171	**SCH**: Pangavhane **M**: +91-(0253) 2571439, 2317248 **PC**: Magar **M**: +91-0253-2571439
	8. Pune Region				
01	Maharashtra Institute of Technology, S No 124, Kothrud, Paud Road, Ex Servicemen Colony, Pune – 411 038 Ph(W): 020-25437681, 25437682 Fax(W): +91-20-25442770 Email: mitycmou@hotmail.com Web Site: http://www.mitpune.com	8-T24-001	120	62173	**SCH**: Mangesh Karad **M**: +91-(020)32900895 **PC**: Ganesh Borikar **M**: +91-(020)30273629

02	All India Shri Shivaji Memorial Society's Polytechnic, S.S.P.M. School Campus, Library Building, Second Floor, 55/56, Shivajinagar, Pune – 411 001 Ph(W): 020-25437681/2, 26058077, 26058287 Fax(W): +91-20-25442770 Email: aissmspolypune@rediffimail.com Website: www.aissmspoly.org.in	8-T24-002	60	62198	**SCH**: Mr. S.B. Patil **M**: +91-9850515217 **PC**: Mr. B.S.Patil **M**: +91-9881245429
03	M I T College of Engineering, S No 124, Kothrud, Paud Road, Ex Servicemen Colony, Pune – 411 038 Ph(W): 020-25437681, 25437682 Fax(W): +91-20-25442770 Email: mitycmou@hotmail.com Web Site: http://www.mitpune.com	8-T24-003	120	62173	**SCH**: Mangesh Karad **M**: +91-(020)32900895 **PC**: Prof Anand Tappu **M**: +91-9850627506
04	Sri Savitribai Phule Polytechnic College, S No 124, MIT Campus, Kothrud, Paud Road, Ex Servicemen Colony, Pune – 411 038 Ph(W): 020-25464131, 30273629 Fax(W): +91- Email: mitycmou@hotmail.com Web Site: http://www.mitpune.com	8-T24-004	120	62173	**SCH**: Mangesh Karad **M**: +91-(020)32900895 **PC**: N K Patil **M**: +91-(020)25442770
05	Karmaveer Bhaurao Patil College of Engineering & Polytechnic Camp, Near Circuit House Satara – 415 001	8-T24-005	30	6409A	**SCH**: Thorat R.A. **M**: +91-(02162)235767 **PC**: Dilip Aldar **M**: +91-9226814409
9. Outside Maharashtra, Within India Region					
	No Study Centers	SC Ref	SIT	Code	**SCH**: **M**: +91- **PC**: **M**: +91-
9. Outside India Region					
	No Study Centers	SC Ref	SIT	Code	**SCH**: **M**: +91- **PC**: **M**: +91-

SYLLABUS FOR

SEMESTER 01

TML011: Applied Physics

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
01	TML011	Applied Physics	4	45	120	100	TH
01	TML011	Applied Physics	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: •	After successful completion of this course, student should be able to • Apply basic facts, concepts, principles and techniques of scientific investigation of physical quantities and processes which are used in technology

Units

UN	Name of the Unit	CSs	Questions
1 2 3 4	SI Units Vectors and Scalars Motion, Work, Energy and Power Circular Motion	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
5 6 7	Centre of Gravity Moment of Inertia Mechanism of Simple Machines	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

8 9 10	Simple Harmonic Motion Wave Motion Sound	**CP Block 02 CSs 21-30**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
11 12 13	Light Electrostatics Capacitance and Condensers	**CP Block 02 CSs 31-40**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**SI Units:** Different System of Measurement, Dimensions of a physical quantity, Measuring Instruments	CP Bock 01
2	**Vectors and Scalars:** Vectors and Scalars, Addition and Subtraction of Vectors, Finding the Magnitude and Direction of Resultant by Analytical Method, Resolution of a Vector, Product of Vectors	
3	**Motion, Work, Energy and Power:** Velocity and Acceleration, Equation of Motion (Constant acceleration), Law of Motion, Moment of a force or torque, Work, Energy, Power	
4	**Circular Motion**: Circular motion, Rotation motion under constant angular acceleration, Relation between angular and linear quantities, Acceleration in uniform circular motion, Centripetal force and centrifugal force	
5	**Centre of Gravity:** It is possible to represent a body by a point, Locating the Centre of Gravity, Centre of Gravity and Centroid, Centre of Gravity of Some Regularly Shaped Bodies, Experimental Determination of the Centre of Gravity, Some Features of The CG, Some Applications	CP Bock 02
6	**Moment of Inertia:** Torque, Moment of Inertia : Rational equivalent to the Mass, Moment of Inertia of Some Regularly Shaped Objects, Calculation of MI for Some Regularly Shaped Objects	
7	**Mechanism of Simple Machines:** What is a Simple Machine, Some Simple Machines, Gears, Types of Drives	
8	**Simple Harmonic Motion:** What is Simple Harmonic Motion (SHM)? Equation of SHM, Important terms in SHM, Graphical Representation of SHM, Phase and Phase difference, Acceleration in SHM	CP Bock 03
9	**Wave Motion:** What is a Wave? Formation of wave motion, Types of waves, Stationary Waves	
10	**Sound:** Sound Wave, Stationary waves, Audible range, Intensity of sound, Infrasonics and Ultrasonics	
11	**Light:** Reflection, Refraction, Different types of Lenses, Refraction Through the Prism, Visible Spectrum, Optical Fibers	CP Bock 04
12	**Electrostatics:** Concept of an Electric Charge, Concept of an Electric Field, Concept of	

	Electric Potential	
13	**Capacitance and Condensers:** Capacitance and its Unit, Condenser Principle, Charging and Discharging a Condenser, Factors Affecting Capacitance of Capacitor, Types of Condensers (as per geometrical shapes) Types of Condensers (as per dielectric medium used), Condensers in Series, Condensers in Parallel	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TES011-TB1 TML011-TB1	Introduction to Mechanics, YCMOU Team	1st 1994	81-7171-477-3 YCMOU
TES011-TB2 TML011-TB2	Mechanics, YCMOU Team	1st 1994	81-7171-478-1 YCMOU
TES011-TB3 TML011-TB3	Wave Motion, YCMOU Team	1st 1994	81-7171-479-X YCMOU
TES011-TB4 TML011-TB4	Light and Electrostatics, YCMOU Team	1st 1994	81-7171-480-3 YCMOU
Reference-Books			
TES011-RB1 TML011-RB1	Applied Physics Lal H.H. and Sawney B.K.		Tata McGraw-Hill
TES011-RB2 TML011-RB2	Physics for Technicians Zebrowski E.		Tata MacGraw Hill
CD / DVD			
TML011-CD1			
Web Links			
TML011-WL1			

TML012: Applied Mathematics - 1

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
01	TES012	Applied Mathematics - 1	4	45	120	100	TH
01	TML012	Applied Mathematics - 1	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: •	After successful completion of this course, student should be able to • Apply basic facts, concepts, principles and procedures of mathematics as a tool to analyze engineering problems

Units

UN	Name of the Unit	CSs	Questions
1 2 3 4 5 6 7 8	Sets and Number System Indices and Logarithms Quadratic Equations Surds Determinants Functions Progressions and Series Mensuration	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
9 10 11 12	Introduction to Trigonometry Allied, Compound and Multiple Angles Solution of a Triangle Complex Numbers	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
13 14 15	Straight Line Circle and Conic Sections Graphs	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
16 17 18	Vector Algebra Boolean Algebra Introduction to Statistics	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**Sets and Number System:** What is a set?, Comparison of sets, Operations of sets, Number System	CP Bock 01
2	**Indices and Logarithms:** Laws of indices, What is Logarithm? What are the laws of logarithms? Change of base, Common (Standard) logarithms, Relation between Napier's and standard (common) logarithms	
3	**Quadratic Equations:** Solution of a Quadratic Equation, Nature of roots, Relation	

	between roots and coefficients, Construction of quadratic equation, Equations reducible to quadratic form, Applications	
4	**Surds:** What is Surd? Types of Surds, Comparison of Surds, Operations on Surds, Square root of a binomial, Quadratic Surds	
5	**Determinants:** Second order determinant, Cramer's rule, Third order determinant, Simultaneous equations in three unknowns	
6	**Functions:** Functions, Graph of a functions Examples of functions Exponential and Logarithmic functions, Types of functions, Inverse of a function, Forms of expressing a function, Composite functions	
7	**Progressions and Series:** Sequences, Series, Arithmetic Progression (A.P.), Geometric Progression (G.P.) Some important Series, The Arithmetic Mean (A.M.) and The Geometric Mean (G.M.), Binomial Theorem	
8	**Mensuration:** Area of Plane Objects, Rectangular Solid of Parallelepiped, Cylinder, Sphere, Cone	
9	**Introduction to Trigonometry:** Angles and Measurement of an angle, Trigonometric ratios of an angle, Trigonometric (circular) functions, Fundamental Identities, Use of calculator and tables, Inverse circular functions	**CP Bock 02**
10	**Allied, Compound and Multiple Angles:** Trigonometric ratios of allied angles, Trigonometric ratios of compound angles, Product-to-sum and sum-to-product formulae, Double angle and Half angle formulae	
11	**Solution of a Triangle:** Solution of a right angle triangle, The Sine rule, Cosine rule, Projection formulae (second form of the law of cosine), Half angle formulae, Area of a triangle, Solution of general triangle	
12	**Complex Numbers:** Complex numbers, Representation of a complex numbers, De-Moivre's Theorem, Roots of a complex numbers, Exponential functions, Circular functions, Hyperbolic functions	
13	**Straight Line:** Distance between two points, Section Formula, Equation of a Straight Line, The General Equation of a Line, Angle between two lines	**CP Bock 03**
14	**Circle and Conic Sections:** Equation of a Circle, Tangent and Normal to a circle, Conic Section	
15	**Graphs:** Graphical solution of simultaneous linear equation, Graphs of trigonometric functions, The straight line law ($y = mx + c$)	
16	**Vector Algebra:** Scalars and Vectors, Addition of Vectors, Scalar multiplication of a vector, Position Vector, Components of Vectors, Collinear and Coplanar Vectors, Product of two vectors, Scalar or Dot Product, Vector or Cross Product, Scalar triple Product, Physical Interpretation of Different Products	**CP Bock 04**
17	**Boolean Algebra:** Number system, Boolean Algebra, Properties of combinational circuits, Additional Properties of Boolean Algebra, Equivalence of two circuits, Sum of products form	
18	**Introduction to Statistics:** Statistical Population, Variates and Attributes, Discrete and Continuous variable, Frequency Distribution Graphical representation Measures of Central Tendency, Measures of Dispersion, Probability Theory, Some useful results on probability	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TES012-TB1 TML012-TB1	Basic Concepts, YCMOU Team	1st 1994	81-7171-469-2 YCMOU
TES012-TB2 TML012-TB2	Trigonometry and Complex Number, YCMOU Team	1st 1995	81-7171-470-6 YCMOU
TES012-TB3 TML012-TB3	Coordinate Geometry and Graphs, YCMOU Team	1st 1994	81-7171-471-4 YCMOU
TES012-TB4 TML012-TB4	Vector Algebra, Boolean Algebra and Statistics, YCMOU Team	1st 1994	81-7171-472-2 YCMOU
Reference-Books			
TES012-RB1 TML012-RB1	Engineering Mathematics Grewal B.S.	40th Edition 2009	81-7409-195-5 Khanna Publishers
TES012-RB2 TML012-RB2	Applied Mathematics (Volumes I and II) P. N. Wartikar and J. N. Wartikar		Pune Vidyarthi Griha Prakashan, Pune
CD / DVD			
TML012-CD1			
TML012-CD2			
Web Links			
TML012-WL1			
TML012-WL2			

TML013: Self-Study Skills

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type

01	TES013	Self-Study Skills	4	45	120	100	TH
01	TML013	Self-Study Skills	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: •	After successful completion of this course, student should be able to • enhance the overall learning activity by making use of various self-study skills • Effectively speak on any matter

Units

UN	Name of the Unit	CSs	Questions
1 2	Introduction Listening and Speaking Skills	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3 4	Reading and Writing Skills Observation Skills	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
5 6	Library and Reference Skills Self Directed Learning and Self Evaluation	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
7	Essential Study Skills for Science Students	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**Introduction:** Self Learning Skills Development Package	CP Bock 01
2	**Listening and Speaking Skills:** Listening Skills and Problems, Types of Listening Comprehension, Listening Skills, Non-Verbal Listening, Advantages of Listening, Listening Span and Barriers to Listening, Tips for Effective Listening, Effective Speaking : A Skill, Speak Correctly, Speak Appropriate Words, Speaking Different Situations, Non-Verbal Communication, Barriers to Effective Speaking, Tips to Speak Effectively	
3	**Reading and Writing Skills:** What is Reading?, Skimming, Skimming and Scanning as Study Skills, Intensive Reading, Use of Mental Skills, Reading Speed and Comprehension, Motivation and Concentration, Writing Technique, What Do We Write?, Organizing the Materials, Developing the Outline, Beginning the Article, Developing the Article, Ending	CP Bock 02

	the Article, Grammar for the Clarity and Correctness, Vocabulary Building, Simple Spelling Rules, Letter Writing, Review	
4	**Observation Skills:** Observation Skills, Observation and Sensory Organs, Processes in Observation	
5	**Library and Reference Skills:** Library and You, Various Types of Libraries, How to Find a Book in a Library?, Reference Books	**CP Bock 03**
6	**Self Directed Learning and Self Evaluation:** Basic Concepts, Steps in Self Directed Learning, Engaging in Self Directed Learning, Process of Learning, Evaluation of Self Directed Learning	
7	**Essential Study Skills for Science Students:** Developing Good Study Habits, Sharping Your Memory, Getting the Most Out of Lectures and Labs, Getting the Most Out of Reading Assignments, Improving Your Test-taking Abilities, Becoming a Critical Thinker	**CP Bock 04**

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TES013-TB1 TML013-TB1	Introduction, YCMOU Team,	1st 2002	978-81-265-1878-4 YCMOU
TES013-TB2 TML013-TB2	Listening and Speaking Skills, YCMOU Team,	1st 2002	81-8055-019-2 YCMOU
TES013-TB3 TML013-TB3	Reading and Writing Skills, YCMOU Team,	1st 2002	81-8055-020-6 YCMOU
TES013-TB4 TML013-TB4	Observation Skills, YCMOU Team,	1st 2002	81-8055-021-4 YCMOU
TES013-TB5 TML013-TB5	Library and Reference Skills, YCMOU Team,	1st 2002	81-8055-022-2 YCMOU
TES013-TB6 TML013-TB6	Self Directed Learning and Self Evaluation, YCMOU Team,	1st 2002	81-8055-023-0 YCMOU
TES013-TB7 TML013-TB7	Essential Study Skills for Science Students, Chiras,	1st 2000 SYE	0-534-37595-2 Thomson Learning
Reference-Books			
TML013-RB1			
CD / DVD			
TML013-CD1			
TML013-CD2			
Web Links			
TML013-WL1			
TML013-WL2			

TML014: Technical Communication

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
01	TES014	Technical Communication	4	45	120	100	TH
01	TML014	Technical Communication	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: •	After successful completion of this course, student should be able to • Effectively communicate about any technical matter

Units

UN	Name of the Unit	CSs	Questions
1 2 3	Communication and Your Career Reader Centered Communication Process Conducting Research	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4 5	Drafting Paragraphs, Sections and Chapters Beginning a Communication	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
6 7 8 9	Ending a Communication Developing an Effective Style Checking and Reviewing Drafts Communicating Electronically: Email and Web Sites	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

10 11 12 13	Creating and Delivering Oral Presentation Creating Communications with a Team Proposals Formats for Letter, Memos and Books	**CP Block 02 CSs 31-40**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Communication and Your Career**: Communication Expertise Will Be Critical to Your Success, Writing at Work Differs from Writing at School, At Work, Writing Is an Action, The Main Advice of this Book: Think Constantly about Your Readers, Qualities of Effective On-the-Job Communication: Usability and Persuasiveness, The Dynamic Interaction between Your Communication and Your Readers, Some Reader-Centered Strategies You Can Begin Using Now, Communicating Ethically, What Lies Ahead in This Book, Exercises	**CP Bock 01**
2	**Reader Centered Communication Process**: Central Principles of the Reader-Centered Approach, Writing Your Resume, Electronic Resumes: Special Considerations, Writing Your Job Application Letter, Ethical Issues in the Job Search, Writing for Employment in Other Countries, Conclusion, Exercises	
3	**Conducting Research**: Special Characteristics of On-the-Job Writing, Define your research objectives, Create an efficient and productive research plan , Check each source for leads to other sources, Carefully evaluate what you find, Begin interpreting your research results even as you obtain them, Take careful notes, Ethics Guideline: Observe copyright law and intellectual property rights, Ethics Guideline: Document your sources, Conclusion, Exercises, Reference Guide	
4	**Drafting Paragraphs, Sections and Chapters:** Begin by announcing your topic, Present your generalizations before your details, Move from most important to least important, Reveal your communication's organization, Consult conventional strategies when having difficulties organizing, Consider your readers' cultural background when organizing, Ethics Guideline: Remember the human consequences of what you're drafting, Conclusion, Exercises, Reference Guide	**CP Bock 02**
5	**Beginning a Communication**: Give your readers a reason to pay attention, State your main point, Tell your readers what to expect, Encourage openness to your message, Provide necessary background information, Adjust the length of your beginning to your readers' needs, For longer communications, begin with a summary, Adapt your beginning to your readers' cultural background, Ethics Guideline: Begin to address unethical practices promptly- and strategically, Conclusion, Exercises	
6	**Ending a Communication**: After you've made our last point, stop, Repeat your main point, Summarize your key points, Refer to a goal stated earlier in your communication, Focus on a key feeling, Tell your readers how to get assistance or more information, Tell your readers what to do next, Identify any further study that is needed, Follow applicable social conventions, Conclusion, Exercises	**CP Bock 03**
7	**Developing an Effective Style**: Creating your Voice, Find out what's expected Consider the roles your voice creates for your readers and you, Consider how your attitude toward your subject will affect your readers, Say things in your own words, Ethics	

	Guideline: Avoid Stereotypes, Constructing Sentences, Simplify your sentences, Put the action in your verbs, Use the active voice unless you have a good reason to use the passive voice, Emphasize what's most important, Smooth the flow of thought from sentence to sentence, Vary your sentence length and structure, Selecting Words, Use concrete, specific words, Use specialized terms when – and only when – your readers will understand them, Use words with appropriate associations, Choose plain words over fancy ones, Ethics Guideline: Use inclusive language, Conclusion, Exercises	
8	**Checking and Reviewing Drafts**: Performing your own Quality Check, Check from your readers' point of view, Check from your employer's point of view, Distance yourself from your draft, Read your draft more than once, changing your focus each time, Use computer aids to find (but not to cure) possible problems, Ethics Guideline: Consider the stakeholders' perspective, Reviewing, Discuss the objectives of the communication and the review, Build a Positive interpersonal relationship with your reviewers or writer, Rank suggested revisions-and distinguish maters of substance form matter of taste, Explore fully the reasons for all suggestion, Use computer aids for reviewing in a reader-entered way, Ethics Guideline: Review form the stakeholders' perspective, Conclusion, Exercises	
9	**Communicating Electronically: Email and Web Sites:** Using Email, Observe the email conventions where you work, Keep your messages brief, Make your messages easy to read on screen, Provide an informative, specific subject line, Take time to revise, Remember that email isn't private, Creating Web Site, Begin by defining your site's objectives, Provide quick and easy access to the information your readers want, Design pages that are easy to read and attractive, Design your site for international and multicultural readers, Enable readers with disabilities to use your site, Help readers find your site on the Internet, Test your site on multiple platforms and browsers before launching it, Keep your site up to date, Ethics Guideline: Respect intellectual property and provide valid information, Exercises	
10	**Creating and Delivering Oral Presentation**: Define your presentation's objectives, Select the form of oral delivery best suited to your purpose and audience, Focus on a few main points, Use a simple structure-and help your listeners follow it, Use a conversational style, Look at your audience, Prepare for interruptions and questions-and respond courteously, Fully integrate graphics into your presentation, Rehearse, Accept your nervousness-and work with it, Making Team Presentations, Conclusion, Exercises	**CP Bock 04**
11	**Creating Communications with a Team:** Select the most effective structure for your team's collaboration, Create a consensus on the communication's objectives, Involve the whole team in planning, Make a project schedule, Share leadership responsibilities, Make meeting efficient, Encourage, discussion, debate, and diversity of ideas, Be sensitive to possible cultural and gender differences in team interactions, Use computer support for collaboration when it's available, Conclusion, Exercises	
12	**Proposals:** The Variety of Proposal-Writing Situations, Proposal Readers Are Investors, The Questions Readers Ask Most Often, Strategy of the Conventional Superstructure for Proposals, Superstructure for Proposals, Sample Proposal	
13	**Formats for Letter, Memos and Books:** Letter format, Memo Format, Book Format, Resume and Job Application Letter, Informational Web Site, Informational Page, Brochure, Project Proposal, Progress Report	

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TES014-TB1 TML014-TB1	Technical Communication : A Reader Centered Approach, Anderson,	5th 2003 SYE	0-1550-7421-0 Thomson Learning
Reference-Books			
TML014-RB1			
CD / DVD			
TML014-CD1			
TML014-CD2			
Web Links			
TML014-WL1			
TML014-WL2			

TML015: Computer Fundamentals

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
01	TES015	Computer Fundamentals	4	60	120	100	P
01	TML015	Computer Fundamentals	4	60	120	100	P

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • • •	After successful completion of this course, student should be able to • Use basic commands of DOS • Use basic features of Windows 2000 • Use basic features of MS Word, MS Excel, MS Power Point and MS Access

	• Use basic features of Front page, MS Outlook and Internet

DETAIL SYLLABUS

Note:

Work Book shall consist of a record in the form of a journal consisting of the list of activities, printouts and necessary documentation for the following exercises. Students are expected to perform all activities and get workbook certified from the Practical Lab Instructor.

UN	Name of the Practical Activity	CSs	Questions
1	A. **Introduction**: Introduction to Computers, History of Computers, Basic Anatomy of Computers B. **MS DOS**: DOS Commands	**CP Block 01** **CSs 01-30**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
2	**Windows 2000**: Features of Windows 2000, Multimedia, Network and Explorer		
3	A. **Creation of New Email Account**: Create your own Email account on http://www.hotmail.com and set the account preferences while registration. Create your signature in hotmail account with following details: 1) Name, 2) Postal Address, 3) Phone, 4) PRN, 5) Allotted Study Centre Name and code B. **Email with File Attachment**: Send an email to your hotmail account with sample image file attachment from your hotmail account. Receive this email and confirm signature appended with it C. **Outlook Express Exercise**: Add your email (hotmail) account in 'outlook express' and explore the settings. Create your signature in 'outlook express' with following details: 1) Name, 2) Postal Address, 3) Phone, 4) PRN, 5) Allotted Study Centre Name and code. D. **MSN Messenger Exercise**: Add your account in MSN Messenger and download the contacts list from web site http://wwww.ycmou.com and add it to your account on messenger.		

4	**Activities to be perform on university website** http://wwww.ycmou.com A. Registered yourself on the School of Science and Technology discussion forum B. Browse active topic available on the discussion forum C. Subscribe to whole discussion forum D. Browse FAQ (Frequently Asked Questions) E. Interact on Student Services Forum and Online Counseling Forum by posting few questions/queries F. Post reply to already posted articles/questions/queries on any one of the forums		
5	**Activities to be perform on university website** http://wwww.ycmou.com A. Download one of the Virtual Classroom Modules (VCM) from university web site. B. Install essential freeware specified for it. C. Use it in 1) Group Learning Mode (Full Screen Mode) and 2) Self Study Mode D. Search the important information on the university website and on www.google.com		
6	**Activities to be perform on university website** http://wwww.ycmou.com A. Registered yourself on 'Online Self -Test Centre' of School of Science and Technology. B. Explore your knowledge by giving Self Test on any one of courses and take a print out of grade sheet for the same.	**CP Block 02** **CSs 31-60**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
7	**Word Basics**: Starting Word, Creating Documents, Parts of Word Window, Some 'Don'ts', Formatting Features, Menus, Commands, Toolbars and their Icons, Word Exercise 1		
8	**Word Basics**: Word Exercise 2		
9	**Word Basics**: Word Exercise 3		
10	**Excel Basics**: Introduction, Menus, Commands, Toolbars and Their Icons, Excel Exercise I		
11	**Excel Basics**: Excel Exercise II and Excel Exercise III	**CP Block 03** **CSs 61-90**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
12	**Power Point Basics**: Introduction, Toolbars, Their Icons and Commands, Navigating in Power Point		
13	**Working with Power Point**: Performs Sample Exercises		
14	**MS Access**: Introduction, Parts of an Access Window, Tool Bars and Their Icons, Starting Microsoft Access, Creating a New Database, Creating a Database through Table Wizard		

15	**MS Access**: Creating a New Table, Rename Columns, Saving the Database, Relationships, Creating Table through Design View, Relationship, Query, Forms, Reports, Exiting MS Access		
16	**MS Front Page**: Introduction, Toolbars, Commands and Their Icons, Starting MS Front Page, Creating a Web Page without a Wizard	**CP Block 04** **CSs 91-120**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
17	**MS Front Page**: Creating a Web through a Wizard, Creating a Web Page with a Wizard		
18	**MS Outlook**: Introduction, Parts of an Outlook Window, Menus, Commands, Toolbars and their Icons, Working with Outlook		
19	Collect data sheets for Different Computer Systems and compare them with respective to all important parameters		
20	Collect data sheets for any one device; Laser Printer, Ink-Jet Printer, Modem, Scanner, Web-Cam		

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TES015-TB1 TML015-TB1	A First Course in Computers, Sanjay Saxena,	2003 SYE	81-259-1447-1 Vikas Publishing House
Reference-Books			
TES015-RB1 TML015-RB1	Comdex Computer Course Kit Vikas Gupta	1st Reprint 2002	Dreamtech, New Delhi
CD / DVD			
TML015-CD1			
Web Links			
TML015-WL1			

Semester 02

TML021: Engineering Drawing - 1

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering

4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

COURSE INFORMATION

Sem	Code	Course Name	CP	CST	ST	Marks	Type
02	TES021	Engineering Drawing - 1	4	45	120	100	TH
02	TML021	Engineering Drawing - 1	4	45	120	100	TH

PRESUMED KNOWLEDGE AND LEARNING OBJECTIVES

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: •	After successful completion of this course, student should be able to • Use drawing instruments • Read simple technical drawings • Prepare simple technical drawings • Analyze simple technical drawings

UNITS

UN	Name of the Unit	CSs	Questions
1 2 3 4	Drawing Instruments and Their Uses Sheet Layout and Sketching Lines, Lettering and Dimensioning Scales	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
5 6	Geometrical Construction Curves Used in Engineering Practice	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
7 8 9 10	Loci of Points Orthographic Projection Projections of Points Projections of Straight Lines	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
11 12 13	Projections of Auxiliary Planes Projections of Planes Projections of Solids	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP

		Block
1	**Drawing Instruments and Their Uses:** Introduction, Drawing board, T-square, Set-squares, Drawing instrument box, Scales, Protractor, French curves	CP Bock 01
2	**Sheet Layout and Sketching:** Sheet layout, Types of machine drawings, sketching	
3	**Lines, Lettering and Dimensioning:** Introduction, Lines, Lettering, Dimensioning, Dimensioning terms and notations, Placing of dimensions, Unit of dimensioning, General rules for dimensioning, Practical hints on dimensioning	
4	**Scales:** Introduction, Scales, Scales on drawings, Types of scales	
5	**Geometrical Construction:** Introduction, Bisecting a line, To draw perpendiculars, To draw parallel lines, To divide a line, To bisect an angle, To trisect an angle, To find the centre of an arc, To construct equilateral triangles, To construct squares, To construct regular polygons, Special methods of drawing regular polygons, Regular polygons inscribed in circles, To draw regular figures using T-square and set-squares, To draw tangents, Lengths of arcs, Circles and lines in contact, Inscribed circles	CP Bock 02
6	**Curves Used in Engineering Practice:** Introduction, Conic sections, Ellipse, Parabola, Hyperbola, Tangents and normals to conics, Cycloidal curves, Cycloid, Trochoid, Epicycloid and hypocycloid, Epitrochoid, Hypotrochoid, Involute, Evolutes, Spirals, Archemedian spiral, Logarithmic or equiangular piral, Helix, A method of drawing a helical curve, Helical springs, Screw threads, Helix upon a cone, Can	
7	**Loci of Points:** Introduction, Loci of points, Simple mechanisms, The slider-crank mechanism, A four-bar mechanism	CP Bock 03
8	**Orthographic Projection:** Introduction, Principle of projection, Methods of projection, Orthographic projection, Planes of projection, Four quadrants, First-angle projection, Third-angle projection, Reference line, B.I.S. code of practice	
9	**Projections of Points:** Introduction, A point is situated in the first quadrant, A point is situated in the second quadrant, A point is situated in the third quadrant, A point is situated in the fourth quadrant, General conclusions	
10	**Projections of Straight Lines:** Introduction, Line parallel to one or both the planes, Line contained by one or both the planes, Line perpendicular to one of the planes, Line inclined to one plane and parallel to the other, Line inclined to both the planes, Projections of lines inclined to both the planes, Line contained by a plane perpendicular to both the reference planes, True length of a straight line and its inclinations with the reference planes, Traces of a line, Methods of determining traces of a line, Traces of a line, the projections of which are perpendicular to xy, Positions of traces of a line	
11	**Projections of Auxiliary Planes:** Introduction, Types of auxiliary planes and views, Projection of a point on an auxiliary plane, Projections of lines and planes by the use of auxiliary planes, To determine true length of a line, To obtain point-view of a line and edge-view of a plane, To determine true shape of a plane figure	CP Bock 04
12	**Projections of Planes:** Introduction, Types of planes, Traces of planes, General conclusions, Projections of planes parallel to one of the reference planes, Projections of planes inclined to one reference plane and perpendicular to the other, Projections of oblique planes	
13	**Projections of Solids:** Introduction, Types of solids, Projections of solids in simple positions, Projections of solids with axes inclined to one of the reference planes and parallel to the other, Projections of solids with axes inclined to both the H.P. and the	

	V.P., Projections of spheres	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TES021-TB1 TML021-TB1	Engineering Drawing, Bhat and Panchal,	46th 2003	81-85594-17-1 Charotar Publishing House
Reference-Books			
TES021-RB1 TML021-RB1	Engineering Drawing, Shah M B, Rana B C	2nd 2010	978-81-317-1056-2 Pearson
TES021-RB2 TML021-RB2	Engineering Drawing, Dhananjay Jolhe,	Second reprint 2008	978-0-07-064837-1 Tata McGraw-Hill
TES011-RB3 TML011-RB3			
CD / DVD			
TES021-CD1 TML021-CD1			
Web Links			
TES021-WL1 TML021-WL1			

TML022: Applied Mathematics - 2

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
02	TES022	Applied Mathematics - 2	4	45	120	100	TH
02	TML022	Applied Mathematics - 2	4	45	120	100	TH

PRESUMED KNOWLEDGE AND LEARNING OBJECTIVES

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: •	After successful completion of this course, student should be able to • Apply basic facts, concepts, principles and procedures of mathematics as a tool to analyze engineering problems

UNITS

UN	Name of the Unit	CSs	Questions
1 2 3	Limits Derivatives Application of Derivatives	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4 5 6	Principles of Integration Methods of Integration Application of Integration	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
7 8 9	Introduction to Differential Equations Equations of 1^{st} order and 1^{st} degree Application of Differential Equations to Electrical Circuits	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
10 11 12	Laplace Transforms Inverse Laplace Transforms Applications of Laplace Transforms	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Limits:** Concept of Limit, The meaning of x → a, The meaning of $f(x) \rightarrow 1$as x → a, To find limit of function using graph, Algebra of Limits, Various approaches to find Limits Trigonometric Limits, Change of Limit, Logarithmic and Exponential Limits, Continuity	CP Bock 01
2	**Derivatives:** The Derivative, First Principle Method of Finding Derivative of a Function, Algebra of Derivatives (Rules of Differentiation), The Chain Rule, Derivatives of Inverse Trigonometric Functions, Differentiation of Parametric Function, Higher Order Derivative, Leibnitz's Theorem	
3	**Application of Derivatives:** Application of Derivatives to Geometry, Derivative as a Rate Measurer, Related Rates, Maximum and Minimum Values of Given Function	
4	**Principles of Integration:** Integration as the Inverse Process of Differentiation, Definition of Indefinite Integral, The Constant of Integration 'C', Standard Formulae of Integration, Algebra of Integrals, Illustrative Examples	CP Bock 02
5	**Methods of Integration:** Methods of Integration, Integration by Substitution, Important	

	Deductions from Theorem-1, Method of Integration by Parts, Compilation of all the Formulae, Integration of Rational Functions by Partial Fractions, Definite Integrals	
6	**Application of Integration:** Area Under a Curve, Mean Values, Root Mean Square Value (R. M. S. Value)	
7	**Introduction to Differential Equations:** Differential Equation, Formation of Differential Equation, Solution of a Differential Equation	**CP Bock 03**
8	**Equations of 1st order and 1st degree**: Differential Equations of First Order and First Degree, Solution of the Differential Equation of First Order and First Degree	
9	**Application of Differential Equations to Electrical Circuits:** Simple Electric Circuits, RL Circuit, RC Circuit	
10	**Laplace Transforms:** Definition of Laplace Transform, Laplace Transforms of some Elementary Functions	**CP Bock 04**
11	**Inverse Laplace Transforms:** Inverse Laplace Transform	
12	**Applications of Laplace Transforms:** Applications of Laplace Transforms in Solving First Order and First Degree Differential Equations, Solution of Simultaneous Differential Equations	

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TES022-TB1 TML022-TB1	Differential Calculus, YCMOU Team	1st 1994	81-7171-473-0 YCMOU
TES022-TB2 TML022-TB2	Integral Calculus, YCMOU Team	1st 1995	81-7171-474-9 YCMOU
TES022-TB3 TML022-TB3	Differential Equations, YCMOU Team	1st 1995	81-7171-475-7 YCMOU
TES022-TB4 TML022-TB4	Laplace Transforms, YCMOU Team	1st 1994	81-7171-476-5 YCMOU
Reference-Books			
TES022-RB1 TML022-RB1	Advanced Engineering Mathematics Erwin Kreyszig	8th Edition 2009	978-81-265-0827-3 Wiley India
TES022-RB2 TML022-RB2	Higher Engineering Mathematics B.V. Ramana		Tata McGraw-Hill
TES022-RB3 TML022-RB3	Applied Mathematics (Volumes I and II) P. N. Wartikar & J. N. Wartikar		Pune Vidyarthi Griha Prakashan, Pune
TES022-RB4 TML022-RB4	Higher Engineering Mathematics, Dr B S Grewal,	40th Edition 2009	81-7409-195-5 Khanna Publishers
CD / DVD			
TML022-CD1			
Web Links			

TML022-WL1			

TML023: Engineering Drawing-2

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
02	TES023	Engineering Drawing-2	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML021	After successful completion of this course, student should be able to • Use drawing instruments • Read simple technical drawings • Prepare simple technical drawings • Analyze simple technical drawings

Units

UN	Name of the Unit	CSs	Questions
1 2	Sections of Solids Development of Surfaces	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3 4	Intersection of Surfaces Isometric Projection	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
5 6 7	Oblique Projection Perspective Projection Conversion of Pictorial views into Orthographic Views	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

8 9 10	Centres of Gravity and Moments of Inertia of Ares Nomography Computer Aided Drafting	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Sections of Solids:** Introduction, Sections of prisms, Sections of pyramids, Sections of cylinders, Sections of cones, Sections of spheres, Typical Problems, Exercises	CP Bock 01
2	**Development of Surfaces :** Introduction, Methods of development, Developments of lateral surfaces of right solids, Cube, Prisms, Cylinders, Pyramids, Cone, Development of transition pieces, Spheres, Exercises	
3	**Intersection of Surfaces :** Introduction, Line of intersection, Methods of determining the line of intersection between surfaces of two interpenetrating solids, Intersection of two prisms, Intersection of cylinder and cylinder, Intersection of cylinder and prism, Intersection of cone and cylinder, Intersection of cone and prism, Intersection of cone and cone, Intersection of sphere and cylinder or prism, Exercises	CP Bock 02
4	**Isometric Projection:** Introduction, Isometric axes, lines and planes, Isometric scale, Isometric drawing or Isometric view, Isometric graph, Illustrative problems, Isometric drawing of planes or plane figures, Isometric drawing of prisms and pyramids, Isometric drawing of cylinders, Isometric drawing of cones, Isometric drawing of spheres, Typical problems, Exercises	
5	**Oblique Projection:** Introduction, Principle of oblique projection, The oblique projection and the isometric projection, Receding lines and receding angles, Types of oblique projection, Rules for the choice of position of an object, Steps for drawing the oblique projection, Exercises	CP Bock 03
6	**Perspective Projection:** Introduction, Principle of perspective projection, Definition of perspective elements, Station point, Picture plane, Methods of drawing, Distance points, Parallel perspectives, Measuring line or line of heights, Perspectives of circles and solids, Typical problems, Exercises	
7	**Conversion of Pictorial views into Orthographic Views:** Introduction, Orthographic projection, Procedure for preparing a scale-drawing, Illustrative problems, Exercises	
8	**Centre of Gravity and Moments of Inertia of Areas:** Introduction, Centre of gravity, Centre of gravity of symmetrical areas, Centre of gravity of unsymmetrical areas, Illustrative problems on centre of gravity, Moments of inertia of areas, Exercises	CP Bock 04
9	**Nomography:** Introduction, Types of nomographs, Definitions of various terms, Principle of construction of nomographs of three variables, Method of constructing parallel scale nomographs, Layout of nomographs, Z type nomographs, Exercises	
10	**Computer Aided Drafting:** Introduction, Reasons for implementing a CAD system, Application of CAD, Benefits of CAD, Limitations of CAD, Hardware of CAD System, CAD Software, AutoCAD, Exercises	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML023-TB1	Engineering Drawing, Bhat and Panchal,	46th 2003	81-85594-17-1 Charotar Publishing House,
Reference-Books			
TML023-RB1	Engineering Drawing, Shah M B, Rana B C	2nd 2010	978-81-317-1056-2 Pearson
TML023-RB2	Engineering Drawing, Dhananjay Jolhe,	Second reprint 2008	978-0-07-064837-1 Tata McGraw-Hill
CD / DVD			
TML023-CD1			
Web Links			
TML023-WL1			

TML024: Machine Drawing

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
02	TML024	Machine Drawing	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML021 • TML023	After successful completion of this course, student should be able to • Use drawing instruments • Read simple technical drawings • Prepare simple technical drawings • Analyze simple technical drawings

UNITS

UN	Name of the Unit	CSs	Questions
1 2 3	Sectional Views Orthographic Reading or Interpretation of Views Screw Threads	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4 5 6 7	Screwed Fastenings Keys, Cotter-Joints, Pin-Joints Pipe Joints Valves	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
8 9 10 11 12	Riveted Joints and Welded Joints Shaft Bearings, Brackets and Hangers Shaft Couplings, Clutches and Brakes Pulleys Spur Gearings	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
13 14 15	Engine Parts Elements of Production Drawings Assembly Drawings	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Sectional Views :** Introduction, Cutting-plane line, Types of sectional views, Full section, Half section, Partial or broken section, Revolved section, Removed section, Offset section, Sectioning conventions, Hatching or section, lines, Conventions of section lines	CP Bock 01
2	**Orthographic Reading or Interpretation of Views :** Introduction, Reading of orthographic views, Missing lines and missing vies, Identification of planes	
3	**Screw Threads :** Introduction, Definitions, Forms of screw threads, Triangular or V threads, Square thread, Conventional representation, Multiple-start threads, Right-hand and left-hand threads	
4	**Screwed Fastenings :** Introduction, Types of nuts, Hexagonal nut, Square nut, Types of nuts for special purpose, Washers, Types of bolts, Forms of bolts, Methods of preventing rotation of a bolt while screwing a nut on or off it, Set-screws, Locking arrangements for nuts, Foundation bolts, Spanner, Longitudinal or bar stay	CP Bock 02
5	**Keys, Cotter-Joints, Pin-Joints :** Introduction, Keys joints, Cotter and cotter joints, Pin-joint or Knuckle joint	
6	**Pipe Joints :** Introduction, Cast=iron pipes, Cast-iron flanged joint, Socket and Spigot joint, Hydraulic joint, Wrought-iron and steel pipes, Copper pipes, Union joint, Lead pipes, Expansion joints, Piping drawings	
7	**Valves :** Introduction, Types of valves, Flap valve, India-rubber disc valve, Ball valve, Metal disc valve, Stop valves, Feed-check valve, Safety valves, Spring-loaded safety valves, Lever safety valve, Dead-weight safety valve, Blow-off cock	

8	**Riveted Joints and Welded Joints :** Introduction, Riveting, Caulking and fullering, Forms and proportions of rivet-heads, Failure of riveted joints, Dimensions of a riveted joint, Types of riveted joints, Lap joint, Butt joint, Rolled-steel sections, Connection of plates at right angles, Gusset stay Welded joints, Welding, types of welding process, Representation of welded joints	**CP Bock 03**
9	**Shaft Bearings, Brackets and Hangers :** Introduction, Journal bearings, Solid bearing, Bushed bearing, Pedestal bearing or plummer block, Methods of preventing rotation of brasses in a bearing, Pivot bearing, Foot-step bearing, Wall brackets, Hangers, Wall-plates, Wall-box	
10	**Shaft Couplings, Clutches and Brakes :** Introduction, Fast or rigid couplings, Box or muff coupling, Half-lap coupling, Split-muff coupling, Flanged coupling, Protected type flange-coupling, Solid flanged coupling, Flexible couplings, Universal coupling or Hook's joint, Oldham's coupling, Gear coupling, Loose or disengaging couplings or clutches, Claw coupling or clutch, Conical friction coupling or cone friction clutch, Single plate clutch, Brakes	
11	**Pulleys :** Introduction, Types of Pulleys, C. I. belt pulleys, Fast and loose pulleys, Speed cones or stepped pulleys, Split pulleys, Built-up pulleys, Rope pulleys, V-belt pulleys	
12	**Spur Gearings :** Introduction, Spur gear definitions, Relationship between the pitches, Tooth proportions, Involute spur gear, Construction of base circles, Approximate construction of teeth profile, Rack and pinion, Cycloidal tooth profile	
13	**Engine Parts :** Introduction, Steam engine, Cylinder cover, Pistons, Stuffing boxes, Cross-heads, Connecting roads, Cranks, Eccentrics, Slide valves, An i. C. engine, Piston, Connecting road, Crankshaft	**CP Bock 04**
14	**Elements of Production Drawings :** Introduction, Geometrical tolerances, Types of geometrical tolerances, Terminology for geometrical, Representation of geometrical Dimensional tolerances, Terminology for dimensional , Selection of tolerances, Representation of dimensional tolerances, Representation of dimensional tolerances on drawings, Fits, Hole basis and shaft basis system, Representation of holes, Surface-roughness, Terminology for surface roughness, Representation of surface roughness on drawings	
15	**Assembly Drawings :** Introduction, Types of assembly drawings, Accepted norms, Sequences of preparing the assembly drawing	

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML024-TB1	Machine Drawing, Bhat and Panchal,	38th 2003	81-85594-19-8, Charotar Publishing House,
Reference-Books			
TML024-RB1			
CD / DVD			
TML024-CD1			
Web Links			
TML024-WL1			

TML025: Engineering and Machine Drawing

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
02	TML025	Engineering and Machine Drawing	4	60	120	100	P

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML021 • TML023 • TML024	After successful completion of this course, student should be able to • Understand graphical language and explore drawing skill required by engineers

Detail Syllabus

Note: Sheet should be prepared on A2 (594X420mm) (Half imperial) size drawing screen using any drafting software/package as detailed below. Work Book shall consist of a record in the form of a journal consisting of the list of activities, printouts (if any) and necessary documentation for the following exercises. Students are expected to perform all activities and get workbook certified from the Practical Lab Instructor.

UN	Name of the Practical Activity	CSs	Questions
1	Problems on lettering, Scale, curves	CP Block 01 CSs 01-30	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
2	Simple Orthographic Projections-two objects – one for first angle and one for third angle		
3	Orthographic Projection with sections (First objects as above)		
4	Orthographic Projection with sections (Second objects as above)		
5	Isometric Projections – Two Simple objects (without curves) one by natural scale one by isometric scale		

6	Isometric Projections with slopes, slots, curves etc First objects	**CP Block 02** **CSs 31-60**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
7	Isometric Projections with slopes, slots, curves etc Second objects		
8	One sheet on projection of lines – (4 problems)		
9	One sheet on projection of planes (4 problems)		
10	One sheet on projection of solids (3 problems)		
11	One sheet on sections of solids	**CP Block 03** **CSs 61-90**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
12	Free hand sketches of type of thread profiles, nuts, bolts, screws etc.		
13	Sheet based one PIE and BAR charts, flow charts, block diagrams - 1		
14	Sheet based one PIE and BAR charts, flow charts, block diagrams - 2		
15	1 sheet on Intersection on solids.		
16	1 sheet on Development of surfaces.	**CP Block 04** **CSs 91-120**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
17	1 sheet on Arbor & couplings		
18	1 sheet on pipe joints		
19	Techno-commercial Information on Computer Aided software's available in the market with their Specifications		
20	Collect data on Screwed Fastenings Keys, Types of Joints, Shaft Bearings, Brackets and Hangers, Shaft Couplings, Clutches and Brakes, Pulleys, Spur Gearings and engine parts		

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML025-TB1	-	-	-
Reference-Books			
TML025-RB1	Engineering Drawing, Shah M B, Rana B C	2nd 2010	Pearson
CD / DVD			
TML025-CD1			
Web Links			
TML025-WL1			

SEMESTER 03

TML031: Basic Electrical Engineering

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
03	TES031	Basic Electrical Engineering	4	45	120	100	TH
03	TML031	Basic Electrical Engineering	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML012: Applied Mathematics-1	After successful completion of this course, student should be able to • Explain different concepts related to electrical theory • Handle various measuring instruments

Units

UN	Name of the Unit	CSs	Questions
1 2 3	Electrical Quantities and Ohm's Law Series Circuits Parallel Circuits	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4	Combinational Circuits	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

5	Measuring Instruments	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
6 7 8	Magnetic Induction Alternating Current Three Phase Circuits	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Electrical Quantities and Ohm's Law:** The Coulomb, The Amp, The Electron Theory, The Conventional Current Theory, Speed of Current, Basic Electrical Circuits, The Volt, The Ohm, The Watt, Other Measures of Power, Ohm's Law, Metric Units	CP Bock 01
2	**Series Circuits:** Series Circuits, Voltage Drops in a Series Circuit, Resistance in a Series Circuit, Calculating Series Circuit Values, Solving Circuits, Voltage Dividers, The General Voltage Divider Formula, Voltage Polarity, Using Ground as a Reference	
3	**Parallel Circuits:** Parallel Circuit Values, Parallel Resistance Formulas	
4	**Combination Circuits:** Combination Circuits, Solving Combination Circuits, Simplifying the Circuit	CP Bock 02
5	**Measuring Instruments:** Analog Meters, The Voltmeter, Multirange Voltmeters, Reading a Meter, The Ammeter, Ammeter Shunts, Multirange Ammeters, The Ayrton Shunt, AC Ammeters, Clamp-on Ammeters, DC-AC Clamp-on Ammeters, The Ohmmeter, Shunt Type Ohmmeter, Digital Meters, The Low-Impedance Voltage Tester, The Oscilloscope, The Wattmeter, Recording Meters, Bridge Circuits	CP Bock 03
6	**Magnetic Induction:** Magnetic Induction, Fleming's Left-Hand Generator Rule, Moving Magnetic Fields, Determining the Amount of Induced Voltage, Lenz's Law, Rise Time of Current in an Inductor, The Exponential Curve, Inductance, R-L Time Constants, Induced Voltage Spikes	CP Bock 04
7	**Alternating Current:** Advantages of Alternating Current, AC Wave Forms, Sine Wave Values, Resistive Loads, Power in an AC Circuit, Skin Effect in AC Circuits	
8	**Three Phase Circuits:** Three-Phase Circuits, Wye Connections, Delta Connections, Three-Phase Power, Watts and VARs, Three-Phase Circuit Calculations, Load3 Calculations, Load 2 Calculations, Load 1 Calculations, Alternator Calculations, Power Factor Correction	

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			

TES031-TB1 TML031-TB1	Delmar's Standard Text Book of Electricity, Herman,	2nd 1999 **SYE**	0-8273-8550-1 Delmar Publishers,
Reference-Books			
TES031-RB1 TML031-RB1	Electricity : Principles and Applications Fowler	5th 1995	McGraw Hill
CD / DVD			
TES031-CD1 TML031-CD1			
Web Links			
TES031-WL1 TML031-WL1			

TML032: Applied Chemistry

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
03	TML032	Applied Chemistry	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: •	After successful completion of this course, student should be able to • Apply basic facts, concepts, principles and techniques of scientific investigation of chemical properties and processes which are used in technology

Units

UN	Name of the Unit	CSs	Questions

1 2 3	Atomic Structure Electronic Theory of Valency The Periodic Table	**CP Block 01 CSs 01-10**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4 5 6 7	Ionization Electrolysis Applications of Electrolysis Electrochemical Cells	**CP Block 02 CSs 11-20**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
8 9 10 11	Metals and Non-metals Alloys Corrosion Corrective Measures And Lubricants	**CP Block 02 CSs 21-30**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
12 13 14	Polymers Water Ceramics, Glass, Paper and Capacitors	**CP Block 02 CSs 31-40**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Atomic Structure:** Classification of Matter, Definition of Atom, Properties of Atom, Composition of Atom, Atomic Number, Distribution of Electrons	CP Bock 01
2	**Electronic Theory of Valency:** Electronic Configuration of Elements, Valency and Valency Electrons, Metallic And Non-metallic Nature	
3	**The Periodic Table:** Early Attempts of Classification, Mendeleeff's Periodic table, Types of Elements, Nature of Bonding In Crystal Lattice	
4	**Ionization:** What Is Ionization, Arrhenius Theory of Ionization, pH And pH Scale	CP Bock 02
5	**Electrolysis:** Conductors And Non-Conductors, Electrolysis, Selective Discharge of Ions, Faraday's Laws of Electrolysis	
6	**Applications of Electrolysis:** Electrolysis of Aqueous $CuSO_4$, Electroplating, Electro refining, Electrolysis Used In Metallurgy	
7	**Electrochemical Cells:** Electrochemical Cell, Construction of Electrochemical Cell, Measurement of The EMF, Daniel Cell, Dry Cell And Lead Accumulator	
8	**Metals and Non-metals:** General Properties of Metals, Study of Elements, Aluminum Oxide As Insulator,	CP Bock 03
9	**Alloys:** Definition of Alloys, Types of Alloys, Properties of Iron, Alloy Steel, Heat Treatment, Non-Ferrous Alloys, Wood's Metal, Kanthal Alloys, Dental Alloys	
10	**Corrosion:** Definition of Corrosion, Types of Corrosion, Theories of Corrosion, Mechanism and Effects of Corrosion, Cell, Electrode Potential, Electro-chemical Series, Galvanic Series of Metals, Differential Aeration Principle, Composition Cell, Pitting	

	Corrosion, Waterline Corrosion	
11	**Corrective Measures And Lubricants:** Different Methods of Protection, Surface Coating, Non-metallic Coating, Lubricant	
12	**Polymers:** Tetravalent nature of carbon, Elements present in organic compounds, Polymers	
13	**Water:** Hardness of water, Types of hardness, Methods of softening of Water, Lime soda process, Zeolite or permutite process, Ion-exchange or de-ionization process, Degree of hardness, Estimation of hardness	**CP Bock 04**
14	**Ceramics, Glass, Paper and Capacitors:** Ceramics, Glasses, Paper, Capacitors	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML032-TB1	Physical Chemistry, YCMOU Team,	1st 1994	81-7171-463-3 YCMOU
TML032-TB2	Electro-Chemistry, YCMOU Team,	1st 1994	81-7171-464-1 YCMOU
TML032-TB3	Inorganic Chemistry, YCMOU Team,	1st 1994	81-7171-465-X YCMOU
TML032-TB4	Organic Chemistry, YCMOU Team,	1st 1995	81-7171-466-8 YCMOU
Reference-Books			
TML032-RB1			
CD / DVD			
TML032-CD1			
Web Links			
TML032-WL1			

TML033: Basic Electronics

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
03	TML033	Basic Electronics	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML031: Basic Electrical Engineering	After successful completion of this course, student should be able to • Explain facts, concepts, principles and procedures of basic electronics devices and circuits and their applications in electronics systems

Units

UN	Name of the Unit	CSs	Questions
1 2 3 4 5 6	Semiconductor Fundamentals PN Junction Diodes Zener Diodes Bipolar Transistors Field Effect Transistors Thyristors	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
7 8 9 10 11	Integrated Circuits Optoelectric Devices Power Supplies Amplifier Basics Amplifier Applications	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
12 13 14 15 16	Oscillators Waveshaping Circuits Binary Number System Basic Logic Gates Simplifying Logic Circuits	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
17 18 19	Sequential Logic Circuits Combinational Logic Circuits Microcomputer Basics	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**Semiconductor Fundamentals:** Semiconduction in Germanium and Silicon, Conduction in Pure Germanium and Silicon, Conduction in Doped Germanium and Silicon	CP Bock 01
2	**PN Junction Diodes:** PN Junctions, Diode Biasing, Diode Characteristics, Diode Construction Techniques, Testing PN Junction Diodes	
3	**Zener Diodes:** Zener Diode Characteristics, Zener Diode Ratings, Voltage Regulation with Zener Diodes, Testing Zener Diodes	

4	**Bipolar Transistors:** Transistor Construction, Transistor Types and Packaging, Basic Transistor Operation, Transistor Testing, Transistor Substitution	
5	**Field Effect Transistors:** Junction FETs, Depletion Insulated Gate FETs (MOSFETs), Enhancement Insulated Gate FETs (MOSFETs), MOSFET Safety Precautions, Testing FETs	
6	**Thyristors:** Silicon-Controlled Rectifiers, TRIACs, Bidirectional Trigger Diodes, Testing Thyristors	
7	**Integrated Circuits:** Introduction to Integrated Circuits, Integrated Circuit Construction Techniques, Integrated Circuit Packaging	**CP Bock 02**
8	**Optoelectric Devices:** Basic Principles of Light, Light-Sensitive Devices, Light-Emitting Devices	
9	**Power Supplies:** Transformers, Rectifier Circuits, Filter Circuits, Voltage Regulators, Voltage Multipliers, Circuit-Protection Devices	
10	**Amplifier Basics:** Amplifier Configurations, Amplifier Biasing, Amplifier Coupling	
11	**Amplifier Applications:** Direct-Coupled Amplifiers, Audio Amplifiers, Video Amplifiers, RF and IF Amplifiers, Operational Amplifiers	
12	**Oscillators:** Fundamentals of Oscillators, Sinusoidal Oscillators, Nonsinusoidal Oscillators	**CP Bock 03**
13	**Waveshaping Circuits:** Nonsinusoidal Waveforms, Waveshaping Circuits, Special-Purpose Circuits	
14	**Binary Number System:** Binary Numbers, Binary and Decimal Conversion, BCD Code	
15	**Basic Logic Gates:** AND Gate, OR Gate, NOT Gate, NAND Gate, NOR Gate, Exclusive OR and NOR Gates	
16	**Simplifying Logic Circuits:** Veitch Diagrams, Kamaugh Maps	
17	**Sequential Logic Circuits:** Flip-Flops, Counters, Shift Registers, Memory	
18	**Combinational Logic Circuits:** Encoders, Decoders, Multiplexers, Arithmetic Circuits, Programmable Logic Devices (PLD)	
19	**Microcomputer Basics:** Computer Basics, Microprocessor Architecture, Microcontrollers	

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML033-TB1	Introduction to Electronics, Gates,	4th 2001 **SYE**	0-7668-1698-2 Thomson Learning,
Reference-Books			
TML033-RB1			
CD / DVD			
TML033-CD1			
Web Links			
TML033-WL1			

TML034: Electric Machines

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
03	TES034	Electric Machines	4	45	120	100	TH
03	TML034	Electric Machines	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML031: Basic Electrical Engineering • TML033: Basic Electronics • TML012: Applied Mathematics	After successful completion of this course, student should be able to • Apply basic facts, concepts, principles and operation & control of electric machines and applications of electrical energy in manufacturing industry

Units

UN	Name of the Unit	CSs	Questions
1 2	Single - Phase Transformers Three - Phase Transformers	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3 4	Direct Current Generators Direct Current Motors	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

5 6	Three-Phase Alternators Three-Phase Motors	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
7	Single-Phase Motors	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Single - Phase Transformers:** Single-Phase Transformers, Isolation Transformers, Autotransformers, Transformer Polarities, Voltage and Current Relationships in a Transformer, Testing the Transformer, Transformer Ratings, Determining Maximum Current, Transformer Impedance	CP Bock 01
2	**Three - Phase Transformers:** Three-Phase Transformers, Closing a Delta, Three-Phase Transformer Calculations, Open Delta Connection, Single-Phase Loads, Closed Delta with Centre Tap, Closed Delta without Center Tap, Delta-Why Connection with Neutral, T-Connected Transformers, Scott Connection, Zig-Zag Connection, Harmonics	
3	**Direct Current Generators:** What is a Generator?, Armature Windings, Brushes, Pole Pieces, Field Windings, Series Generators, Shunt Generators, Compound Generators, Compounding, Counter torque, Armature Reaction, Setting the Neutral Plane, Paralleling Generators	CP Bock 02
4	**Direct Current Motors:** DC Motor Principles, Shunt Motors, Series Motors, Compound Motors, Terminal Identification for DC Motors, Determining the Direction of Rotation of a DC Motor, Speed Control, The Field Loss Relay, Horsepower, Brushless DC Motors, Converters, Permanent Magnet Motors, The Right-Hand Motor Rule,	
5	**Three-Phase Alternators:** Three-Phase Alternators, The Rotor, The Brushless Exciter, Alternator Cooling, Frequency, Output Voltage, Paralleling Alternators, Sharing the Load, Field Discharge Protection	CP Bock 03
7	**Three-Phase Motors:** Three-Phase Motors, The Rotating Magnetic Field, Connecting Dual-Voltage Three-Phase Motors, Squirrel-Cage Induction Motors, Wound Rotor Induction Motors, Synchronous Motors, Selsyn Motors	
8	**Single-Phase Motors:** Single-Phase Motors, Split-Phase Motors, Resistance-Start Induction-Run Motors, Capacitor-Start Induction-Run Motors, Dual-Voltage Split-Phase Motors, Determining the Direction of Rotation for Split-Phase Motors, Capacitor-Start Capacitor-Run Motors, Shaded-Pole Induction Motors, Multispeed Motors, Repulsion Type Motors, Construction of Repulsion Motors, Repulsion-Start Induction-Run Motors, Repulsion-Induction Motors, Single-Phase Synchronous Motors, Stepping Motors, Universal Motors	CP Bock 04

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TES034-TB1 TML034-TB1	Delmar's Standard Text Book Of Electricity, Herman,	2nd 1999 **SYE**	0-8273-8550-1 Delmar Publisher,
Reference-Books			
TML034-RB1			
CD / DVD			
TML034-CD1			
Web Links			
TML034-WL1			

TES035: Electrical and Electronics Engineering

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
03	TML035	Electrical and Electronics Engineering	4	60	120	100	P

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML031 • TML032 • TML034	After successful completion of this course, student should be able to • Operate and measure various electrical characteristics of components and devices using electrical and electronics instruments • Analyze and troubleshoot the simple electrical and electronics circuits

Detail Syllabus

Note:

Work Book shall consist of a record in the form of a journal consisting of the list of activities, printouts (if any) and necessary documentation for the following exercises. Students are expected to perform all activities and get workbook certified from the Practical Lab Instructor.

UN	Name of the Practical Activity	CSs	Questions
1	a) To Study Analog and Digital Multimeters and Measurement of Resistance b) To Study Series and Parallel Resistance Circuits	CP Block 01 CSs 01-30	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
2	a) To Study Voltage Measurement using Voltmeters and Variable voltage power supply b) To Study Current Measurement and Control of Direct Current		
3	a) To Verify Experimentally Ohm's Law and its Verification on the Series Circuit b) To Verify The Characteristics of Parallel Circuit		
4	a) To Study Characteristics of Series- Parallel Circuits, II b) To Verify Experimentally Kirchhoff's Voltage and Current Law		
5	To Study Characteristics of Electromagnetic Induction and Devices		
6	To Study Characteristics and testing of a) Junction Diode, b) Zener Diode and c) Optoelectronic Devices	CP Block 02 CSs 31-60	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
7	To Study Half-Wave, Full-Wave Rectifiers and b) Voltage Multiplier Diode Circuit		
8	To Study Characteristics of a) Common-Emitter Amplifier and b) Emitter-Follower Amplifier		
9	a) To Study Characteristics of Field-Effect Transistors and b) To Study Characteristics of SCR		
10	a) To Measure effects of filter components on the dc output of half-wave and full wave rectifiers b) To Test Regulation of Three-Terminal Voltage Regulator		
11	To Study, Measure and Calculate Oscillator Frequency for a) Hartley, b) Phase-Shift and c) Wien Bridge Oscillator	CP Block 03 CSs 61-90	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
12	To Verify Characteristics of Operational Amplifier		
13	To Verify operation of Operational Amplifier Circuits		
14	To Determine and Prove Function Table of an OR, AND, NAND and NOR Gate		
15	To Study and Operate Front Panel Control of CRO		
16	To Study Applications of CRO	CP Block 04	Students have to submit 'Activity Report in Work-Book Format' in CA and
17	Speed Variation of D.C. Shunt Motor		
18	Study of Single Phase Induction Motors		

19	Collect data sheets of following components and instruments from different manufacturers Resistors, Capacitors, Inductor, Analog: Voltmeter, ammeter, Wattmeter, Multimeter.	CSs 91-120	Perform 'Practical Activity' and face Viva for end exam on these units.
20	Collect data sheets of following instruments from different manufacturers: Digital Multimeter, Cathode Ray Oscilloscope (CRO)		

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML035-TB1	-	-	-
Reference-Books			
TML035-RB1	Electricity-Electronics Fundamentals: A Text-Lab Manual, Zbar and Sloop,	4th 1993	0-07-113780-7 McGraw-Hill,
CD / DVD			
TML035-CD1			
Web Links			
TML035-WL1			

Semester 04

TML041: Engineering Mechanics-1

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
04	TML041	Engineering Mechanics-1	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML011 • TML012 • TML022	After successful completion of this course, student should be able to • Analyze any problem in a simple and logical manner • Apply a few basic principles and concepts of mechanics to solve real world problems

UNITS

UN	Name of the Unit	CSs	Questions
1 2	Review of Concepts in Mechanics Equilibrium of a Particle	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3	Two Dimensional Forces, Couples and Rigid Body Equilibrium	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4 5	Simple Structures and Machines Centre of Gravity, Centroids and Distributed Forces	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
6	Friction	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Review of Concepts in Mechanics:** Brief History of Mechanics, Newtonian Mechanics, Engineering Mechanics, Units of Measure and Physical Dimensions, Numerical Computations in Engineering, Suggestions for Problem Solving	CP Bock 01
2	**Equilibrium of a Particle:** Concept of Particle Equilibrium, Free-Body Diagrams, Types of Forces, Concept of a Rigid Body, Equilibrium of a Two-Force Member, Transmissibility of Forces That Act on a Rigid Body, Equilibrium of a Rigid Body Subjected to Concurrent Forces	
3	**Two Dimensional Forces, Couples and Rigid Body Equilibrium**: Moment of Coplanar Forces with Respect to an Axis, Resultant of Coplanar Forces That Act on A Rigid Body, Parallel Coplanar Forces and Couples, Moment of a Couple, Lateral Displacement of Forces, Equilibrium of Rigid Body Subjected to Coplanar Forces	CP Bock 02
4	**Simple Structures and Machines:** The Lever, The Pulley, Simple Plane Frames,	CP

	Mechanisms	Bock 03
5	**Centre of Gravity, Centroids and Distributed Forces:** Gravity Axis of Body, Center of Gravity in Cartesian Coordinates, Center of Gravity by Integration, Centroids of Plane Areas and Lines	
6	**Friction:** Frictional Force, Block on an inclined lane: The Angle of Repose, Problems Involving Friction, Simple Machines and Friction, Belt Friction, Friction Clutches1 and Brakes	CP Bock 04

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML041-TB1	Engineering Mechanics: Statics, Boresi and Schmidt,	1st 2001 **SYE**	0-534-95152-X Thomson Learning,
Reference-Books			
TML041-RB1	Engineering Mechanics Timoshenko & Young	4th 1990	McGraw Hill Publisher
CD / DVD			
TML041-CD1			
Web Links			
TML041-WL1			

M07042: Production Technology 1

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
04	M07042	Production Technology 1	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives

For successful completion of this course, student should have successfully completed:	After successful completion of this course, student should be able to
• TML012	• Operate basic machine tools • Perform Basic machining operations

UNITS

UN	Name of the Unit	CSs	Questions
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	Basic Measurement Squares and surface Plates Micrometers Vernier Calipers Gage Blocks Angular Measurement Gages Comparison Measurement The Coordinate Measuring System Measuring With Light Waves Surface Finish Measurement Physics of Metal Cutting Machinability of Metals Cutting Tool Operating Conditions and Tool life	**CP Block 01 CSs 01-10**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
16 17 18 19 20 21 22 23 24 25 26 27	Carbide Cutting Tools Diamond, Ceramic, and Cermet Cutting Cutting Fluids-Types and Applications Drill Presses Drilling Machine Accessories Twist Drills Cutting Speeds and Feed Drilling Holes Reaming Drill Press Operations Engine Lathe Parts Lathe Accessories	**CP Block 02 CSs 11-20**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

28 29 30 31 32 33 34 35 36 37 38 39 40 41	Cutting Speed, Feed, and Depth of Cut Lathe Safety Mounting, Removing, and Aligning Lathe Centers Grinding Lathe Cutting Tools Facing Between Centers Machining Between Centers Knurling, Grooving, and Form Turning Tapers and Taper Turning Threads and Thread Cutting Steady Rests, Follower Rests, And Mandrels Machining in a Chuck Drilling, Boring, Reaming, and Tapping The Vertical Milling Machine Cutting Speed, Feed, and Depth of Cut	**CP Block 02 CSs 21-30**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
42 43 44 45 46 47 48 49 50 51 52 53	End Mills Vertical Mill Operations Special Milling Operations Horizontal Milling Machines and Accessories Milling Cutters Milling Machine Setups Horizontal Milling Operations The Indexing, or Dividing, Head Gears Gear Cutting Helical Milling Cam, Rack, Worm, and Clutch Milling	**CP Block 02 CSs 31-40**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	Basic Measurement	**CP Bock 01**
2	Squares and Surface Plates	
3	Micrometers	
4	Vernier Calipers	
5	Gage Blocks	
6	Angular Measurement	
7	Gages	
8	Comparison Measurement	
9	The Coordinate Measuring System	
10	Measuring with Light Waves	
11	Surface Finish Measurement	
12	Physics of Metal Cutting	
13	Machinability of Metals	
14	Cutting Tools	

15	Operating Conditions and Tool life	
16	Carbide Cutting Tools	CP Bock 02
17	Diamond, Ceramic, and Cermet Cutting Tools	
18	Cutting Fluids -Types and Applications	
19	Drill Presses	
20	Drilling Machine Accessories	
21	Twist Drills	
22	Cutting Speeds and Feed	
23	Drilling Holes	
24	Reaming	
25	Drill Press Operations	
26	Engine Lathe Parts	
27	Lathe Accessories	
28	Cutting Speed, Feed, and Depth of cut	CP Bock 03
29	Lathe Safety	
30	Mounting, Removing, and Aligning Lathe Centers	
31	Grinding Lathe Cutting Tools	
32	Facing Between Centers	
33	Machining Between Center	
34	Knurling Grooving, and Form Turning	
35	Tapers and Taper Turning	
36	Threads and Thread Cutting	
37	Steady Rests, Follower Rests, and Mandrels	
38	Machining in a Chuck	
39	Drilling, Boring, Reaming, and Tapping	
40	The Vertical Milling Machine	
41	Cutting Speed, Feed, and Depth of cut	
42	End Mills	CP Bock 04
43	Vertical Mill Operations	
44	Special Milling Operations	
45	Horizontal Milling Machines and Accessories	
46	Milling Cutters	
47	Milling Machine Setups	
48	Horizontal Milling Operations	
49	The indexing, or dividing, Head	
50	Gears	
51	Gear Cutting	
52	Helical Milling	

53	Cam, Rack, Worm, and Clutch Milling	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
M07042-TB1	Technology of Machine Tools, Krar, Gill, Smid	6th 2005	07-111-295-2 The McGraw Hill,
Reference-Books			
M07042-RB1			
CD / DVD			
M07042-CD1			
Web Links			
M07042-WL1			

M07043: Production Technology 2

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
04	M07043	Production Technology 2	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • M07042: Production Technology 1	After successful completion of this course, student should be able to • Operate basic machine tools • Perform basic machining operations

Units

UN	Name of the Unit	CSs	Questions

1 2	Welding Techniques Surface Roughness And Its Measurement	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3 4 5	Boring Broaching Grinding	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
6 7 8	Jigs And Fixtures Microfinishing Processes Surface Preparation And Coating Techniques	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
9 10	Presses And Press Working Metal Forming Processes	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Welding Techniques**: Introduction, Classification of welding process, Gas welding, Arc welding, Resistance welding, TIG welding, MIG welding, Submerged arc welding, Atomic hydrogen welding, Plasma arc welding, Electroslag welding, Thermit welding, Ultrasonic welding, Electron beam welding, Laser welding	CP Bock 01
2	**Surface Roughness And Its Measurement**: Introduction, Factors contributing to quality of surface finish, Some important surface characteristics, Purpose of finishing surfaces with respect to their function, Analysis of surface profiles, Symbols for designating surface roughness, Surface roughness obtained from various processes, Methods of measuring surface roughness	
3	**Boring:** Introduction, Classification of boring machines, Specifications of a boring machine, Boring tools, Boring bars, Boring head, Boring defects and possible causes	CP Bock 02
4	**Broaching**: Introduction, Principal parts of broach, Broaching machines, Applications of broaching, Advantages of broaching, Limitations of broaching, Specifications of broaching machines, Broaching tools	
5	**Grinding**: Introduction, Types of grinding machines, Various terms related to grinding wheels, Factors in the selection of grinding wheels, Standard codification of a grinding wheel, Wheel dressing, Wheel truing, Balancing of grinding wheel, Mounting a wheel on the spindle, Wheel speed and its impact on grinding, Work speed and its impact on grinding, Common troubles, causes and their remedies in grinding process Safety in grinding machines	
6	**Jigs And Fixtures**: Introduction, Uses of jigs and fixtures, Difference between a jig and a fixture, Principle of location, Locating devices, Principles of jig and fixture design, Purpose of clamping elements, Types of clamps, Support (rest) of the workpiece, Drill bushes and jigs, Fixtures for milling operations, Welding fixtures, Materials for jigs and	CP Bock 03

	fixtures, Economics, Practical Case studies	
7	**Microfinishing Processes**: Introduction, Honing, Lapping, Polishing, Buffing, Superfinishing, Superfinishing attachment, How Microfinishing processes differ from grinding	
8	**Surface Preparation And Coating Techniques**: Introduction, Surface preparation processes Descaling, Deburring, Degreasing, Surface coating processes, Mechanical coating processes, Thermal coating processes, Chemical coating processes	
9	**Presses And Press Working:** Introduction, Types of presses and their specifications, Press selection, Sheet metal operations, Die components, Principle of metal shearing, Clearance, Centre of pressure, Types of dies, Punch, Pilots, Strippers, Stock stop, Pad, stock Layout	**CP Bock 04**
10	**Metal Forming Processes:** Introduction, Die stamping, Drawing, Spinning, Rolling, Extrusion, Tube drawing, Forging, Powder metallurgy	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
M07043-TB1	Manufacturing Technology M. Adithan, A.B. Gupta	Reprint 2003	81-224-0817-6 New Age International (P) Limited, Delhi
Reference-Books			
M07043-RB1	Engineering Mechanics Timoshenko & Young	4th 1990	McGraw Hill Publisher
CD / DVD			
M07043-CD1			
Web Links			
M07043-WL1			

M07044: Special Manufacturing Processes

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE)

		T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
04	M07044	Special Manufacturing Processes	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • M07042 • M07043	After successful completion of this course, student should be able to • Explore new manufacturing technologies • Describe various advanced machining processes like mechanical, Thermoelectric, Electrochemical and chemical to be used for machining a particular component • Explain basics of die design, its construction and various cutting and forming operations

Units

UN	Name of the Unit	CSs	Questions
1	Manufacturing Technologies	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
2 3 4	**Part-1 Mechanical Advanced Machining Processes** Introduction Abrasive Jet Machining (AJM) Ultrasonic Machining (USM)	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
5	**Part-2 Thermoelectric Advanced Machining Processes** A) Electric Discharge Machining(EDM) B) Electric Discharge Grinding and Electric Discharge Diamond Grinding C) Wire Electric Discharge Machining	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
6 7	Laser Beam Machining **Part-3 Electrochemical and chemical Advanced Machining Processes** Electrochemical Machining(ECM)	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**Manufacturing Technologies**: Coordinate Measuring Systems, Electrical Discharge	CP

	Machining (EDM), Flexible Manufacturing Systems, Group Technology, Just-In-Time Manufacturing, Lasers, Robotics, Statistical Process Control, Stereolithography, Superabrasive Technology, The World of Manufacturing	Bock 01
2	**Introduction:** Why Do We Need Advance Machining Processes (AMPs)?, Advanced Machining Processes, Hybrid Processes	CP Bock 02
3	**Abrasive Jet Machining (AJM):** Introduction, Abrasive Jet Machining Setup, Parametric Analysis, Process Capabilities, Applications	
4	**Ultra Sonic Machining (USM):** Introduction, Ultrasonic Machining System, Mechanics of Cutting, Model Proposed By Shaw, Parametric Analysis, Process Capabilities, Applications	
5	**A) Electric Discharge Machining (EDM):** Introduction, Working Principle Of EDM, RC Pulse Generator, EDM Machine, CNC-EDM, Analysis, Process Variables, Process Characteristics, Application **B) Electric Discharge Grinding and Electric Discharge Diamond Grinding:** Electric Discharge Grinding, Electric Discharge Diamond Grinding **C) Wire Electric Discharge Machining:** Working Principle, Wire EDM Machine, Process Variables, Process Characteristics, Applications, Problems, Bibliography, Self-Test Questions, Review Questions, Nomenclature, At-A-Glance	CP Bock 03
6	**Laser Beam Machining (LBM):** Production of Lasers, Working Principle Of Laser Beam Machining, Types Of Lasers, Process Characteristics, Applications	CP Bock 04
7	**Electro Chemical Machining (ECM):** Introduction, ECM Machine Tool, Advantages And Limitations, Applications, Mechanical Properties of ECM'd Parts, Theory of ECM, Maximum Permissible Feed Rate in ECM, Electrolyte Conductivity (K)	

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
M07044-TB1	Machine Tool and Manufacturing Technology, Krar, Rapisarda, and Check,	1st 1998 **SYE**	0-8273-6351-6 Thomson Learning,
M07044-TB2	Advanced Machining Processes, Vijay K. Jain	1st 1998 **SYE**	81-7764-294-4 Allied Publishers
Reference-Books			
TML044-RB1			
CD / DVD			
TML044-CD1			
Web Links			
TML044-WL1			

TML045: PRODUCTION TECHNOLOGY

PROGRAMME INFORMATION

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

COURSE INFORMATION

Sem	Code	Course Name	CP	CST	ST	Marks	Type
04	TML045	Production Technology	4	60	120	100	P

PRESUMED KNOWLEDGE AND LEARNING OBJECTIVES

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • All courses of semester 4	After successful completion of this course, student should be able to • handle and operate various Mechanical Machines, equipment, tools and devices • measure characteristics of mechanical devices • test and troubleshoot basic mechanical machines and equipment

DETAIL SYLLABUS

Note:

Work Book shall consist of a record in the form of a journal consisting of the list of activities and necessary documentation for the following exercises. Students are expected to perform all activities and get workbook certified from the Practical Lab Instructor.

UN	Name of the Practical Activity	CSs	Questions
1	A. Demonstration of basic tools, machinery, equipment, marking & measuring instrument etc. B. Demonstration of various operations to be performed sequentially.	CP Block 01 CSs 01-30	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
2	A. Selection of materials (types, quality, quantity, size etc.) B. Demonstration of marking and measuring instruments and their specific use.		
3	A. Sufficient practice in handling various tools / equipment / instrument B. Sufficient practice of various operations		

4	Safety awareness on shop floor		
5	One job, which is having marketability to be selected and performed in a group of 2 to 4 student depending on volume of works		
6	One job, a fitting job needs not be a separate activity. It should be practical oriented supporting to other manufacturing activities. Some separate fitting job to be performed like e.g. Take sunk key Preparation of right angle, actual angle, abstute angle, surfaces using filing	**CP Block 02** **CSs 31-60**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
7	Industrial visit : (01 Min) A visit should be arranged to nearby industries to show various tool, equipment / instrument & process working environment etc. Student will submit a report.		
8	One composite job involving different machining operations on lathe, shaper, slotting, drilling machine - 1		
9	One composite job involving different machining operations on lathe, shaper, slotting, drilling machine – 2		
10	One composite job involving different machining operations on lathe, shaper, slotting, drilling machine - 3		
11	Industrial visit shall be arranged to study different types of drilling machine used in industry	**CP Block 03** **CSs 61-90**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
12	Gear of standard size as per I.S.I. standard should be manufacture from the blanks. The gear manufactured should have definite marketability. It should preferably a component of some machine tool. Selection of material, operational sequencing, tool selections, tool holding, job holding, finishing operation selection and performance, Production drawing, machine time calculations, costing, etc - 1		
13	Gear of standard size as per I.S.I. standard should be manufacture from the blanks. The gear manufactured should have definite marketability. It should preferably a component of some machine tool. Selection of material, operational sequencing, tool selections, tool holding, job holding, finishing operation selection and performance, Production drawing, machine time calculations, costing, etc - 2		
14	One practice job consisting grinding operations using Tool & cutter grinder, surface grinder - 1		
15	One practice job consisting grinding operations using Tool & cutter grinder, surface grinder - 2		

16	Industrial visit should be arranged to observe the aspect of gear shaping, gear hobbing broaching operations, practical applications of boring, grinding machine etc. Student will submit the report (2 visits minimum)	CP Block 04 CSs 91-120	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
17	Introduction visit (02 minimum) to be planned to reinforce the related theory studied such as SPM, MMM, erection & testing of machine tools.		
18	Introduction visit (02 minimum) to be planned to reinforce the related theory studied such as SPM, MMM, erection & testing of machine tools.		
19	Techno-commercial information on measuring instruments, tools, equipment, lathe, grinding, drilling machine		
20	Techno-commercial information on AJM, USM, EDM, ECM and LBM		

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML045-TB1	-	-	-
Reference-Books			
TML045-RB1	-	-	-
CD / DVD			
TML045-CD1			
Web Links			
TML045-WL1			

Semester 05

M07051: Strength of Material

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
05	M07051	Strength of Material	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML041	After successful completion of this course, student should be able to • Apply a few basic principles and concepts of mechanics to solve real world problems of mechanical and structural systems

Units

UN	Name of the Unit	CSs	Questions
1 2 3 4 5	Introduction Direct Stress Shear Stress Compound Stress And Strain Elastic Constants	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
6 7 8 9	Shearing Force And Bending Moment Bending Stress Shear Stress in Beams Torsion	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
10 11 12 13 14	Deflection of Beams Built-in And Continuous Beams Bending of Curved Bars And Rigid Frames Plastic Theory of Bending Springs	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
15 16 17 18	Struts Cylinders And Spheres Circular Plates Material Testing And Experimental Methods	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**Introduction:** Strength of Materials, Conditions of Equilibrium, Stress-Strain Relations, Capability, SI Units	CP Bock 01
2	**Direct Stress:** Load, Stress, Principle of St. Venant, Strain, Hooke's Law, Modulus of Elasticity (Young's Modulus), Tensile Test, Factor of Safety, Strain Energy, Resilience, Impact Loads, Varying Cross-section and Load, Compound Bars, Temperature Stresses, Elastic Pickings, Stress Concentrations	

3	**Shear Stress:** Shear Stress, Complementary Shear Stress, Shear strain, Modulus of Rigidity, Strain Energy, Cottered Joints, Riveted Joints, Eccentric Loading	
4	**Compound Stress And Strain:** Oblique Stress, Simple Tension, Note on diagrams, Pure Shear, Pure Normal Stress on Given Planes, General Two-dimensional Stress System, Principal Planes, Principal Stresses, Shorter Method for Principal Stresses, Maximum Shear Stress, Mohr's Stress Circle, Poisson's Ratio, Tow-dimensional Stress System, Principal Strains in Three Dimensions, Principal Stresses Determined from Principal Strains, Analysis of Strain, Mohr's Strain Circle, Volumetric Strain, Strain Energy, Shear Strain Energy, Theories of Failure, Graphical Representation, Conclusions	
5	**Elastic Constants:** Elastic Constants, Bulk Modulus, Relation between E and G	
6	**Shearing Force And Bending Moment:** Shearing Force, Bending Moment, Types of Load, Types of Support, Relations between ω, F and M, Concentrated Loads, Uniformly Distributed Loads, Combined Loads, Varying Distributed Loads, Graphical Method	
7	**Bending Stress:** Pure Bending, Moments of Inertia, Graphical Determination of Moment of Inertia. Bending Stresses, Stress Concentrations in Bending, Combined Bending and Direct Stress, Middle third Rule for Rectangular Sections, Middle Quarter Rule for Circular Sections, Composite Beams, Reinforced Concrete Beams, Principal Moments of Inertia, Unsymmetrical Bending	**CP Bock 02**
8	**Shear Stress in Beams:** Variation of Shear Stress, Rectangular Section, I-Section, Principal Stresses in I-Beams, Pitch of Rivets in Built-up Girders, Solid Circular Section, Thin Circular Tube, Miscellaneous Sections, Shear Centre	
9	**Torsion:** Circular Shafts, Strain Energy in Torsion, Shafts of Varying Diameter, Stress Concentrations in Torsion, Shafts under Action of Varying Torque, Compound Shafts, Torsion Beyond the Yield Point, Combined Bending and Twisting, Rectangular Shafts, Torsion of Thin Tubular Sections, Torsion of Thin-Walled Cellular Sections, Torsion of Thin Rectangular Members, Torsion of Thin Open Sections	
10	**Deflection of Beams:** Strain Energy due to Bending, Application to Impact, Deflection by Calculus, Macaulay's Method, Moment-Area Method, Method of Deflection Coefficients, Deflection due to Shear, Deflection by Graphical Method	
11	**Built-In And Continuous Beams:** Moment-Area Method for Built-in Beams, Macaulay Method, Continuous Beams, Beams on Elastic Foundations, Portal Frames	
12	**Bending of Curved Bars and Rigid Frames:** Stresses in Bars of Small Initial Curvature, Stresses in Bars of Large Initial Curvature, Deflection of Curved Bars (Direct Method), Deflection from Strain Energy (Castigliano's Theorem), Portal Frame by Strain Energy	**CP Bock 03**
13	**Plastic Theory of Bending:** Bending Beyond the Yield Stress, Assumptions in the Plastic Theory, Moment of Resistance at a Plastic Hinge, Collapse Loads, Combined Bending and Direct Stress, Portal Frames-Collapse Loads	
14	**Sprigs:** Close-coiled Helical Springs, Open-coiled Helical Springs, Leaf Springs, Flat Spiral Springs	
15	**Struts:** Definition, Pin-ended (Hinged) Strut Axially Loaded, Direction-fixed at Both Ends, Partial Fixing of the Ends, direction-fixed at One End and Free at the Other, Direction-fixed at One End and Position-fixed at the Other, Strut with Eccentric Load, Strut with Initial Curvature, Limitations of Euler Theory, Rankine-Gordon Formula, Johnson's Parabolic Formula, Perry-Robertson Formula, Straight-Line Formulae, Strut with Lateral Loading, Tie with Lateral Loading, Struts of Varying Cross-Section Energy Method	**CP Bock 04**

16	**Cylinders And Spheres:** Thin Cylinder under Internal Pressure, Thin Spherical Shell under Internal Pressure, Cylindrical Shell with Hemispherical Ends, Volumetric Strain on Capacity, Tube under Combined Loading, Wire Winding of Thin Cylinders, Rotational Stresses in Thin Cylinders, Thick Cylinders Internal Pressure only, Plastic Yielding of Thick Tubes, Compound Tubes, Hub Shrunk on Solid Shaft, Thick Spherical Shells	
17	**Circular Plates:** Circular Plates, Symmetrically Loaded, Solid Circular Plate Annular Ring, Loaded Round Inner Edge	
18	**Material Testing And Experimental Methods**: Tensile Tests, Compression Tests, Hardness Tests, Impact Tests, Effect of Carbon Content, Effect of Tempering Creep, Fatigue, Extensometers, Electrical Resistance Strain Gauges, Photo-Elastic Stress Analysis, Brittle Lacquers	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
M07051-TB1	Strength of Materials, G H Ryder	3rd 1969	0-333-93536-5 Macmillan India Ltd., Delhi
Reference-Books			
M07051-RB1	Strength of Materials S. Ramamrutham	-	-
CD / DVD			
M07051-CD1			
Web Links			
M07051-WL1			

TML052: Engineering Mechanics-2

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
05	TML052	Engineering Mechanics-2	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML012 • TML022 • TML011 • TML041	After successful completion of this course, student should be able to • Analyze any problem in a simple and logical manner • Apply a few basic principles and concepts to solve real world problems

Units

UN	Name of the Unit	CSs	Questions
1	Introduction to Dynamics: Kinematics of Particles	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
2	Kinetics of Particles	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3	Work and Energy Principles for Particles	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4	Momentum Principles for Particles	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**Introduction to Dynamics, Kinematics of Particles:** Introduction to Dynamics, Motion of a Particle on an Axis, Motion of a Particle in Three Dimension, Rotation of a Line in a Plane, Angular Velocity, and Angular Acceleration, Simple Harmonic Motion	CP Bock 01
2	**Kinetics of Particles:** Newton's Law of Universal Gravitation, Newton's Laws of Motion, Newtonian Reference Frames, Applications of Newton's Second Law, Motion of a Particle under the Action of Gravity, The Inertial Force: Particle Motion in an Accelerated Frame	CP Bock 02
3	**Work and Energy Principles for Particles:** Introduction, Work-Force Relationships, Power-Force Relationship, Conservative and Nonconservative Systems, Potential Energy of External and Internal Forces, The General Concept of Energy	CP Bock 03

4	**Momentum Principles for Particles:** Introduction, Laws of Momentum and Conservation of Momentum, Center of Mass of a System of Particles, Collisions, or Impacts, Inelastic Collisions	CP Bock 04

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML052-TB1	Engineering Mechanics: Dynamics, Boresi and Schmidt,	1st 2001 **SYE**	0-534-95162-7 Thomson Learning,
Reference-Books			
TML052-RB1			
CD / DVD			
TML052-CD1			
Web Links			
TML052-WL1			

TML053: Fluid Mechanics

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
05	TML053	Fluid Mechanics	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML012 • TML022	After successful completion of this course, student should be able to • Install, operate, repair and maintain various fluid machines in manufacturing systems applications

Units

UN	Name of the Unit	CSs	Questions
1 2	Basic Concepts Fluid Statics - 1	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3 4	Fluid Statics – 2 Kinematics of Fluid Flow	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
5	Dynamics of Fluid Flow	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
6 7	Pipe Flow Open Channel Flow	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Basic Concepts:** Introduction, Liquids and Gases, System, Property and State, Continuum, Dimensions and Units, Coordinate System, Properties of Fluids	CP Bock 01
2	**Fluid Statics – 1:** Introduction, Pressure at a Point, Basic Equation of Fluid Statics, Measurement of Pressure, Pressure in Accelerated Rigid Body Motion	
3	**Fluid Statics – 2:** Hydrostatic Force on a Plane Surface, Hydrostatic Force on Curved Surface, Hydrostatic Force on Submerged Bodies, Stability of Submerged and Floating Bodies, Aerostatics	CP Bock 02
4	**Kinematics of Fluid Flow:** Introduction, Types of Motion, Streamline, Path Line and Streak Line, Particle Acceleration, Control Volume Approach	
5	**Dynamics of Fluid Flow:** Introduction, The Linear Momentum Equation, Reaction of a Jet, Impact, The Moment of Momentum Equation, Euler's Equation along a Streamline, Bernoulli Equation-Equation of Energy, Energy Correction Factor, Applications of Bernoulli Equation	CP Bock 03
6	**Pipe Flow:** Introduction, Reynolds Experiment, Laminar Flow in Pipes, Turbulent Flow in Pipes, Losses in Pipe Fittings and Valves, Pipes in Parallel, Water Hammer, Quasi-steady Flow in Pipes	CP Bock 04
7	**Open Channel Flow:** Introduction, Classification, Specific Energy, Critical Depth, Flow in a Venturi Flume, Flow through a Sluice Gate, Uniform Flow in Channels, Flow in Circular Pipes with a Free Surface, Optimum Shape of the Cross Section, Hydraulic Jump, Characteristics of Channel Flow, Flow Measurements	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML053-TB1	Fluid Mechanics and Machinery, Agrawal,	3rd 2001 **SYE**	0-07-460005-2 Tata McGraw Hill,
Reference-Books			
TML 053-RB1			
CD / DVD			
TML053-CD1			
Web Links			
TML053-WL1			

TML054: Hydraulic Machines

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
05	TML054	Hydraulic Machines	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML012 • TML022 • TML053	After successful completion of this course, student should be able to • Install, operate, repair and maintain various hydraulic machines in manufacturing systems

Units

UN	Name of the Unit	CSs	Questions

1	Hydraulic Turbines	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
2	Pumps and Fluid Couplings	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3	Compressors	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4 5	Dimensional Analysis and Similitude Flow Measurements	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**Hydraulic Turbines:** Introduction, Elements of a Hydroelectric Power Plant, Classification of Turbines, Fundamental Equation of Hydraulic Machines, Head and Efficiencies of a Turbine, Pelton Turbine, Francis Turbine, Kaplan Turbine, Governing of Water Turbines, Characteristics of Turbines, Selection of Turbines	CP Bock 01
2	**Pumps and Fluid Couplings:** Introduction, Reciprocating Pump, Centrifugal Pump, Gear Pump, Hand Pump, Jet Pump, Deepwell Pump, Hydraulic Ram, Hydraulic Press, Hydraulic Accumulator, Hydraulic Intensifier, Hydraulic Crane, Fluid Coupling	CP Bock 02
3	**Compressors:** Introduction, Classification of Compressor, Reciprocating Compressor, Centrifugal Compressor, Axial Flow Compressor, Fans and Blowers	CP Bock 03
4	**Dimensional Analysis and Similitude:** Introduction, Methods of Dimensional Analysis, Dimensionless Numbers, Principle of Similarity, Resistance of Ships, Unit Quantities, Specific Quantities, Model Testing of Turbines and Pumps, Distorted Scaling of Models	CP Bock 04
5	**Flow Measurements:** Introduction, Measurement of Pressure, Measurement of Velocity, Measurement of Discharge, Measurement of Viscosity, Measurement of Density Variations	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML054-TB1	Fluid Mechanics and Machinery,	3rd	0-07-460005-2

	Agrawal,	2001 **SYE**	Tata McGraw Hill,
Reference-Books			
TML 054-RB1			
CD / DVD			
TML054-CD1			
Web Links			
TML054-WL1			

TML055: Fluid Mechanics and Hydraulic Machines

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
05	TML055	Fluid Mechanics and Hydraulic Machines	4	60	120	100	P

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML052 • TML053 • TML054	After successful completion of this course, student should be able to • Operate various hydraulic and fluid machines in the manufacturing systems

Detail Syllabus

Note:

Work Book shall consist of a record in the form of a journal consisting of the list of activities and necessary documentation for the following exercises. Students are expected to perform all activities and get workbook certified from the Practical Lab Instructor.

UN	Name of the Practical Activity	CSs	Questions
1	Verification of Bernoulli's theorem	**CP Block 01**	Students have to submit 'Activity Report in Work-Book Format' in CA **and**
2	Determination of Cd for venturimeter		
3	Determination of Cv, Cc, Cd for circular orifice		

4	Determination of discharge through rectangular & triangular notch.	CSs 01-30	Perform 'Practical Activity' and face Viva for end exam on these units.
5	Determination of coefficient of friction for different pipes.		
6	Determination of loss of head due to bends, sudden enlargement, sudden contraction	CP Block 02 CSs 31-60	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
7	Trial on pelton wheel.		
8	Trial on Francis turbine. (Plotting of operating characteristic curves in each case, calculation of hyd. Efficiency)		
9	Trial on centrifugal pump. (Calculation of manometric efficiency and plotting operating characteristic curves).		
10	Dismantling, checking reconditioning and assembling a centrifugal pump.		
11	Trial on reciprocating pump (Finding water power, slip)	CP Block 03 CSs 61-90	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
12	Composing of any two peneumatic circuits and testing for achieving rotary and reciprocating motion.		
13	Study of viscosity of given oil with Redwood Viscometer		
14	Study of Laminar & Turbulgnt by Reynolds Apparatus.		
15	Stability of floating bodies.		
16	Study of flow control value.	CP Block 04 CSs 91-120	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
17	Study of accumulators & changing of accumulators		
18	Study of hydraulic motors		
19	Techno-commercial Information on hydraulic motors, Compressors, Pumps		
20	Techno-commercial Information on Turbine and flow measurement devices/sensors		

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML055-TB1	-	-	-
TML055-TB2	-	-	-
Reference-Books			
TML055-RB1			
CD / DVD			
TML055-CD1			
Web Links			
TML055-WL1			

SEMESTER 06

TML061: MANAGEMENT SCIENCE

PROGRAMME INFORMATION

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

COURSE INFORMATION

Sem	Code	Course Name	CP	CST	ST	Marks	Type
06	TES061	Management Science	4	45	120	100	TH
06	TML061	Management Science	4	45	120	100	TH

PRESUMED KNOWLEDGE AND LEARNING OBJECTIVES

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TES014: Technical Communication	After successful completion of this course, student should be able to • Apply basic skills and practices of Management • Deal with unexpected situations • Meet the real world Challenges

UNITS

UN	Name of the Unit	CSs	Questions
1 2	Managing in a Dynamic Environment Ethics and Corporate Social Responsibility	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3 4	Planning and Strategy Fundamentals of Decision Making	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

5 6	Fundamentals of Organization Design Work Motivation	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
7 8 9	Dynamics of Leadership Organizational Communication Controlling in Organization	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Managing in a Dynamic Environment:** Managers and Management, What Mangers Do, Managerial Competencies, Management – A Dynamic Process	CP Bock 01
2	**Ethics and Corporate Social Responsibility:** Importance of Ethics and Corporate Social Responsibility, Four Forces that Shape Ethical Conduct, Three Approaches to Making Ethical Judgments, Managing Corporate Social Responsibility, Encouraging Ethical Conduct	
3	**Planning and Strategy:** The Planning Function, Two Forms of Planning, Levels of Diversification and Planning, Strategic Levels and Planning, Phases of Planning, Generic Competitive Strategies Model	CP Bock 02
4	**Fundamentals of Decision Making:** Role of Decision Making, Decision-Making Conditions, Basic Types of Decisions, Models of Decision Making	
5	**Fundamentals of Organization Design:** Introduction to Organization Design, Basic Types of Departmentalization, Coordination, Authority	CP Bock 03
6	**Work Motivation:** Three Approaches to Motivation, Using Goals and Rewards to Improve Performance, Effects of Job Content and Organizational Context on Motivation, Individual Differences in Motivation, Individual Differences in Motivation, Motivational Forces in Combination, Guidelines for Managers	
7	**Dynamics of Leadership:** Leadership and Power, Traits and Leaders, Behaviors and Leaders, Contingencies and Leaders, Transformational Leaders, Leadership Development	CP Bock 04
8	**Organizational Communication:** The Communication Process, Impact of Information Technology, Hurdles to Effective Communication, Fostering Effective Communication	
9	**Controlling in Organization:** Foundations of Control, Creative Effective Controls, Corrective Control Model, Primary Methods of Control	

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TES061-TB1	Management: A Competency Based	9th	981-240-374-4

TML061-TB1	Approach, Hellriegel, Jackson, Slocum,	2002 **SYE**	Thomson Learning,
Reference-Books			
TES061-RB1 TML061-RB1	Management Richard L Daft	5th 2002	981-240-642-5 Thomson Learning
CD / DVD			
TML061-CD1			
Web Links			
TML061-WL1			

TML062: Entrepreneurship Development

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
06	TES062	Entrepreneurship Development	4	45	120	100	TH
06	TML062	Entrepreneurship Development	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TES061: Management Science	After successful completion of this course, student should be able to • Understand entire process of entrepreneurship development • Develop and begin new business/ company and apply the principles of best entrepreneur

Units

UN	Name of the Unit	CSs	Questions

1 2 3 4	Should You Become an Entrepreneur? What Skills Do Entrepreneurs Need? Entrepreneurs in a Market Economy Select a Type of Ownership	**CP Block 01 CSs 01-10**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
5 6 7	Develop a Business Plan Identity and Meet a Market Need Finance, Protect, and Insure Your Business	**CP Block 02 CSs 11-20**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
8 9 10 11	Choose Your Location & Setup for Business Market Your Business Hire and Manage a Staff Record Keeping and Accounting	**CP Block 02 CSs 21-30**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
12 13 14 15	Financial Management Use Technology Meet Your Legal, Ethical, and Social Obligation Growth in Today's Marketplace	**CP Block 02 CSs 31-40**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Should You Become an Entrepreneur? :** Entrepreneurs: Present and Past, Is Entrepreneurship Right for You?, Identify Business Opportunities and Set Goals	**CP Bock 01**
2	**What Skills Do Entrepreneurs Need? :** Communication Skills, Math Skills, Problem-Solving Skills	
3	**Entrepreneurs in a Market Economy:** What is an Economy, The Concept of Cost, Government in a Market Economy	
4	**Select a Type of Ownership:** Run an Existing Business, Own a Franchise or start a Business, Choose the legal form of your business	
5	**Develop a Business Plan:** Why do you need a business plan?, What goes into a business Plan?, Create an effective business plan	**CP Bock 02**
6	**Identity and Meet a Market Need:** The value of market research, How to perform market research, Identify your competition	
7	**Finance, Protect, and Insure Your Business:** Put together a financial plan, Obtain financing for your business, Theft proof your business, Insure your business	
8	**Choose Your Location & Setup for Business:** Choose a retail business location, Choose a location for a non-retail business, Obtain space and design the physical layout, Purchase equipment, supplies and inventory	**CP Bock 03**
9	**Market Your Business:** The Marketing mix-product, distribution, price, The Marketing mix-promotion, Set marketing goals	
10	**Hire and Manage a Staff:** Hire Employees, Create a compensation package, Manage	

	your staff	
11	**Record Keeping and Accounting:** Set up a record keeping system, Understand basic accounting, Track your inventory	
12	**Financial Management:** Manage your cash flow, Analyze your financial performance, Hire experts	**CP Bock 04**
13	**Use Technology:** Technology and your business, Learn about the internet, Purchase technology	
14	**Meet Your Legal, Ethical, and Social Obligation:** Understand your legal requirements, Ethical issues in business, Meet your social responsibilities	
15	**Growth in Today's Marketplace:** Develop a strategy for growth, Global Trends and opportunities, Culture and business	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TES062-TB1 TML062-TB1	Entrepreneurship Ideas in Action, Greene,	1st 2000 **SYE**	0-538-68268-X Thomson Learning,
Reference-Books			
TML062-RB1			
CD / DVD			
TML062-CD1			
Web Links			
TML062-WL1			

TML063: Engineering Materials-1

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
06	TML063	Engineering Materials-1	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML032	After successful completion of this course, student should be able to • Select appropriate materials • Write correct specifications for the materials

Units

UN	Name of the Unit	CSs	Questions
1 2	The Structure of Materials Properties of Materials	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3	Principles of Polymeric Materials	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4	Selection of Plastic / Polymeric Materials	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
5 6 7	Steel Products Heat Treatment of Steels Carbon and Alloy Steels	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**The Structure of Materials:** The Origin of Engineering Materials, The Periodic Table, Forming Engineering, Materials from the Elements, The solid State, The Nature of Metals, The Nature of Ceramics, The Nature of Polymers, The Nature of Composites	CP Bock 01
2	**Properties of Materials:** The Property Spectrum, Chemical Properties, Physical Properties, Mechanical Properties, Manufacturing Considerations, Property Information	
3	**Principles of Polymeric Materials:** Polymerization Reactions, Basic Types of Polymers, Strengthening Mechanisms, Polymer Families, Thermoplastic Commodity Plastics, Thermoplastic Engineering Plastics, Thermoplastic Engineering Plastics, Thermosetting Polymers, Elastomers, Selection of Elastomers	CP Bock 02
4	**Selection of Plastic / Polymeric Materials:** Methodology of Selection, Plastics for Mechanical and Structural Applications, Wear and Friction of Plastics, Plastics for Corrosion Control, Plastics for Electrical Applications, Polymer Coatings, Adhesives	CP Bock 03

5	**Steel Products:** Iron Ore Benefication, Making of Steel, Steel Refining, Converting Steel into Shapes, Steel Terminology, Steel Specifications	**CP Bock 04**
6	**Heat Treatment of Steels:** Equilibrium Diagrams Morphology of Steel, Reasons for Heat Treating, Direct Hardening, Diffusion Treatments, Softening, Atmosphere Control, Cost of Heart Treating, Selection and Process Specification	
7	**Carbon and Alloy Steels:** Alloy Designation, Carbon Steels, Alloy Steels, Selection of Alloy Steels, High-Strength Sheet Steels, High-Strength, Low-Alloy Steels, Special Steels, Selection and Specification	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML063-TB1	Engineering Material: Properties and Selection, Budinski and Budinski,	7th 2002 **SYE**	81-203-2152-9 Prentice Hall of India,
Reference-Books			
TML063-RB1			
CD / DVD			
TML063-CD1			
Web Links			
TML063-WL1			

TML064: Engineering Materials-2

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
06	TML064	Engineering Materials-2	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives

For successful completion of this course, student should have successfully completed:	After successful completion of this course, student should be able to
• TML063	• Write correct specifications for the materials • Select appropriate materials

UNITS

UN	Name of the Unit	CSs	Questions
1 2	Tool Steels Corrosion	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3 4	Stainless Steels Cast Iron, Cast Steel & Powder Metallurgy Materials	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
5 6 7	Copper and its Alloys Aluminum and its Alloys Surface Engineering	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
8 9	The Selection Process Failure Prevention	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Tool Steels:** Identification and Classification, Tool Steel Metallurgy, Chemical Composition of Tool Steels, Steel Properties, Tool Steel Selection, Specification of Tool Steels, Tool Steel Defects	CP Bock 01
2	**Corrosion:** The Nature of Corrosion, Factors Affecting Corrosion, Types of Corrosion, Determination of Corrosion Characteristics, Corrosion Control	
3	**Stainless Steels :** Metallurgy of Stainless Steels, Alloy Identification, Physical Properties, Mechanical Properties, Fabrication, Corrosion Characteristics, Alloy Selection	CP Bock 02
4	**Cast Iron, Cast Steel and Powder Metallurgy Materials :** Casting Processes, Casting Design, Gray Iron, Malleable Iron, Ductile Iron, White Alloy Irons, Steel Castings, Casting Selection, Powder Metals, Process Selection	
5	**Copper and its Alloys :** Extraction of Copper from Ore, Alloy Designation System, Copper Products, Metallurgy, Properties, Heat Treatment, Fabrication, Wear Resistance, Corrosion, Alloy Selection	CP Bock 03

6	**Aluminum and its Alloys :** General Characteristics, Alloy Designation, Aluminum Products, Metallurgical Characteristics, Heat Treatment, Surface Treatments, Corrosion, Alloy Selection	
7	**Surface Engineering :** Cleaning, Mechanical Finishing of Surfaces, Electroplating, Other Metallic Platings, Electropolishing, Photoetching, Conversion Coatings, Thin-Film Coatings, Surface Analysis, Hardening, Thermal Spraying, High-Energy Process, Diffusion Process, Selective Harding, Special Surface Treatments, Organic Coatings, Process Selection	
8	**The Selection Process :** The Design Process, Selection Factors, A Materials Repertoire, Materials for Typical Machine Components, Selection Case Histories	**CP Bock 04**
9	**Failure Prevention :** Preventing Wear Failures, Preventing Corrosion Failures, Preventing Mechanical Failures, Flaw Detection	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML064-TB1	Engineering Material: Properties and Selection, Budinski and Budinski,	7th 2002 **SYE**	81-203-2152-9 Prentice Hall of India,
Reference-Books			
TML064-RB1			
CD / DVD			
TML064-CD1			
Web Links			
TML064-WL1			

TML065: Diploma Project Work

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T07: Diploma in Communication Engineering(DCE) T03: Diploma in Computer Technology (DCT) T05: Diploma in Industrial Electronics (D Ind E) T06: Diploma in Instrumentation Engineering(D Ins E) T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

COURSE INFORMATION

Sem	Code	Course Name	CP	CST	ST	Marks	Type
06	TES065	Diploma Project Work	4	60	120	100	PW
06	TML065	Diploma Project Work	4	60	120	100	PW

PRESUMED KNOWLEDGE AND LEARNING OBJECTIVES

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • All other courses at Semester 1 to Semester 6 of the respective discipline	After successful completion of this course, student should be able to • explore solutions for the real problems, encountered in a real life job, in the complete project execution from start to finish, by applying basic concepts, principles and skills

DETAIL SYLLABUS

UN	Name of the Practical Activity	CSs	Questions
1	Selection of the Project and Project Guide	CP Block 01 CSs 01-30	Students have to submit 'Activity Report in Project Report Format' in CA and Do 'Project Presentation' and face Viva on Project Report in the end exam on these units.
2	Preparation of Project Execution Plan : Time and Resource Allocation		
3	Guidance by the Project Guide, for the self-study of relevant course topics and concepts by the student		
4	Preparation of Project Specifications by the student: For (1) User Inputs (2) Outputs for User (3) Environmental constraints (4) Other Inputs (5) Other Outputs (6) Other important processes		
5	Guidance and approval by Project Guide for Project Specifications: For (1) User Inputs (2) Outputs for User (3) Environmental constraints (4) Other Inputs (5) Other Outputs (6) Other important processes		
6	Design, Development, Testing and Troubleshooting of First Prototype	CP Block 02 CSs 31-60	Students have to submit 'Activity Report in Project Report Format' in CA and Do 'Project Presentation' and face Viva on Project Report in the end exam on these units.
7	Comparison of First Prototype Performance with Set Project Specifications and Preparation of list showing (1) Problems (2) Improvements Needed (3) External Enclosure Details. The Project Guide should guide the student about this task.	CP Block 03 CSs 61-90	Students have to submit 'Activity Report in Project Report Format' in CA and Do 'Project Presentation' and face Viva on Project Report in the end exam on these units.
8	Design, Development, Testing and Troubleshooting of Final Prototype		

9	Preparation of Project Report and all technical documentation like Schematic Drawings, Connection or Wiring Diagrams, Mechanical Drawings, Complete Bill of Material, User Instructions, Artwork and Films, List of Problems encountered etc.	**CP Block 04** **CSs 91-120**	Students have to submit 'Activity Report in Project Report Format' in CA **and** Do 'Project Presentation' and face Viva on Project Report in the end exam on these units.
10	Final submission of the Project Report		

ACTIVITIES

UN	Guidelines of Project Activities
1	The "Project Work" course envisages to expose the students to actual work environment, work practices during the implementation of a project. The aim is to imbibe in students the principle that working is learning. Learning and working are two sides of the same coin and thus, work experience enhances the learning.
2	**The Project Work must involve practical work related to (1) Electronics Engineering for TES065 and (2) Mechanical Engineering for TML065**.
3	Students are expected to work on "Project Work" for about 6 hours per week (About 2 hour's self-study at residence and 4 hours in counseling session at study center), for **minimum** 20 days in a semester. **Thus only those projects, demanding such study efforts on all those activities, listed in above, should be selected**.
4	As students have to finance expenditure on "Project Work", normally only those projects should be selected, which involve expenditure Rs 3000/- to Rs 6000/-.
5	The original design requirements **are not essential**, although highly encouraged. Hence, normally, projects should not be repeated. The same project undertaken in recent past, by past students, should be avoided. But it is most important that, students must put his independent study efforts on the project. Thus, student should gain practical project execution knowledge about making some useful product, after he goes through all projects completion steps listed above.
6	A single student will normally do a project. The university also encourages large Joint projects, requiring the participation of a small team of students. **However, in such cases, clear delegation of work and responsibilities, among the students, must be clearly stated in the "Project Report". Maximum number of students, in a team for joint project, should not exceed 5**.
7	The student invests his energy, time and resources in a project. The project therefore should, if possible, have important bearing on some practical aspect. This will help student to justify his efforts on project.
8	Employed Students are allowed to complete "Project Work" in the industry where he is employed or his place of choice. Such a student has to identify a resource person in industry, who can take responsibility of guiding him in project work. Such person should be eligible to work as "Project Guide".
9	Study center should assist unemployed students, in locating sponsored "Projects" from local industries. Students are encouraged to locate sponsored projects from the local industries. **But, in case, a student is unable to locate such project, he is also allowed to complete "Project Work" at his study center**.
10	Each "Project Guide" may be assigned **maximum** 5 students.

11	**Suggested Scheme of Chapters in Project Report**: 1. **Chapter 1: Introduction**: Background of the project, Need for the project, Brief idea of the project 2. **Chapter 2: System Overview and Design**: Present the overview of the complete system. Use Block Diagrams. Specify design parameters for the system. Specify interfacing problems (if any) visualized before hand, and how to eliminate these. 3. **Chapter 3: Module Design**: Discuss individual parts (sub-part) in details, clearly indicating the scientific principles involved and design of each sub-circuit used in a project. 4. **Chapter 4: Testing and Troubleshooting**: Discuss how the sub-parts were tested, how the complete system was tested and how measurements were made. Include observations. 5. **Chapter 5: Results and Conclusions**: Analyze the observations made in previous chapter. Discuss why the specifications were not met or the reasons for the failure, if any. Discussed the problems and difficulties encountered and how they were / can be eliminated. Discuss any extension work or modifications, which you want to suggest. 6. **Chapter 6: References**: List the books, magazines and data manuals used.
12	**Submission Process**: Student should prepare 2 copies of the Project Report. At the beginning, the respective Project Guide must approve both copies positively before the end examination of Project Work. Then respective Study Center Coordinator approves both copies of the Project Report. Student should submit one of these approved copies to the study center. The student should retain remaining one of these approved copies. Study center should preserve their copy of, all project reports, till the end examination of Project Work. **Even student must bring his own copy during this end examination**.
13	**Project Report Format**: 1. The project report should be printed on **only right side** of A4 size (210 mm ´ 297 mm) paper. There is **no minimum or maximum page number limit** for the "Project Report", but report of minimum 15–20 page is expected. University recommends only flexible binding for the "Project Report". But, if student wishes, he may also use spiral binding. 2. Margins should be as follows :· ▪ Left Margin : 40 mm ▪ Right Margin : 20 mm ▪ Top Margin : 20 mm ▪ Bottom Margin : 27 mm 3. Header should not be used. Footer, containing page number at the center should only be used, with footer margin of 25 mm. 4. Text should be printed in font size of 12 points and at interline distance of 18 points. (That is 1.5 line spacing). Normally, figures should be embedded in the text, where their first reference occurs. But if necessary, figures may be grouped on separate pages. Figure should be numbered as **'Fig C.F'**, where **'C'** is chapter number and **'F'** is figure number. Figure number **'F'** is reset back to 1 for each new chapter. 5. **Page Sequence**: (1) Cover page as per **specimen 1** (2) Certificate page as per **specimen 2** (3) Acknowledgement page for the help offered by individuals and institution (4) Content page as per **specimen 3**. Following suggested scheme of chapters in project report then follows these first 4 pages.

14 **Specimen of Pages**

Specimen 1

Project Title
Diploma in
Computer Technology (DCT)
Submitted by
Name of Student
Project Guide
Name of Project Guide
Name of the Study Center
Yashwantrao Chavan Maharashtra
Open University
2003

Specimen 2

Certificate
This is to certify that
Mr/Ms ....
..... (PRN: .....)
has successfully completed a project entitled
"....."
in partial fulfillment for the requirement of
Diploma in
Computer Technology (DCT)

Signature with Date	
Project Guide	SC Coordinator
Internal Examiner	External Examiner

Specimen 3

Contents

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TES065-TB1 TML065-TB1	No textbook is specified for this course.		
Reference-Books			

TML065-RB1			
CD / DVD			
TML065-CD1			
Web Links			
TML065-WL1			

SEMESTER 07

M07071: MECHANICAL MEASUREMENTS

PROGRAMME INFORMATION

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

COURSE INFORMATION

Sem	Code	Course Name	CP	CST	ST	Marks	Type
07	M07071	Mechanical Measurements	4	45	120	100	TH

PRESUMED KNOWLEDGE AND LEARNING OBJECTIVES

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML031 • TML033 • TML035	After successful completion of this course, student should be able to • Select and use different instrumentation systems in various applications

UNITS

UN	Name of the Unit	CSs	Questions
1 2	Instrumentation System Sensors and Transducers	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

3 4 5	Strain Gauges Measurement of Force, Torque, Shaft power, speed and Acceleration Signal Conditioning	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
6	Measurement of Process Variables: Pressure, Temperature, Flow and Level	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
7 8 9	Display Devices Determination of Count and measurement of Time, Time Interval and Frequency Control	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**Instrumentation System:** Introduction, Unification, Recent Trends, Characteristics of Measurement Systems	CP Bock 01
2	**Sensor and Transducers:** Introduction, Classification, Transducer Conditioning, Transducer Selection and Specification, Primary Sensing Elements, Resistance Transducers, Variable Inductance type Transducers, Capacitive Transducers, Piezoelectric Transducers, Strain Gauges, Photo sensors, Hall Effect Sensors	
3	**Strain Gauges:** Introduction, gauge and Associated Materials, circuits, Temperature, Compensation, Calibration of strain Gauge, Stress-strain Relations	CP Bock 02
4	**Measurement of Force, Torque, Shaft power, speed and Acceleration**: Introduction, Force and Weight Measurement Systems, Measurement of Torque, Shaft Power, Speed and Velocity, Acceleration	
5	**Signal Conditioning:** Introduction, Interfacing Circuits, Amplifiers, Modulation and Demodulation, Filters, Transmission of signal and Data	
6	**Measurement of Process Variables: Pressure, Temperature, Flow and Level:** Introduction, Pressure, Temperature, Flow rate, Level Measurement	CP Bock 03
7	**Display Devices:** Introduction, Analogue Meter, Digital Readout Systems	CP Bock 04
8	**Determination of Count and Measurement of Time, Time Interval and Frequency:** Introduction, Counters, Time and Frequency Standards, Clock and Watches, Frequency	
9	**Control:** Introduction, Control System Terminology, Digital Control, Actuators/Final Control Elements	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			

M07071-TB1	Instrumentation and Control D, Patranabis,	1st 2003	81-88114-30-8 Umesh Publications
Reference-Books			
M07071-RB1			
CD / DVD			
M07071-CD1			
Web Links			
M07071-WL1			

TML072: Basic Thermodynamics

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
07	TML072	Basic Thermodynamics	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML011 • TML012 • TML022 • TML032	After successful completion of this course, student should be able to • Apply the science of energy transformations involving work, heat and the properties of matter to solve engineering problems

Units

UN	Name of the Unit	CSs	Questions
1 2 3 4 5	Introduction Systems, Processes and Interactions Work Mass, Energy, Temperature and Heat Mechanical Work Processes of Closed System	**CP Block 01 CSs 01-10**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

6 7 8 9 10	Thermodynamic Property Diagrams The Steam Tables Ideal Gases The Mass Balance Equation The First Law of Thermodynamics	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
11 12 13	The Steady Flow Energy Equation Heat Engines The Second Law of Thermodynamics	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
14 15 16 17	Entropy The Carnot Cycle The Rankine Steam Cycle The Air Standard Otto Cycle	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Introduction:** The scope of thermodynamics, Some engineering application areas, Unites & dimensions, Symbols, Representation of numerical data, Practical tips	CP Bock 01
2	**Systems, Processes and Interactions:** Systems, Properties, Processes, Interactions	
3	**Work:** Vector and scalar quantities, Work, Work at the boundary of a system, The sign convention for work, Friction, Fluid friction	
4	**Mass, Energy, Temperature and Heat:** The principle of conservation of mass, Energy, The principle of conservation of energy, Temperature, Heat, The sign convention for heat, Net changes and effects	
5	**Mechanical Work Processes of Closed System:** Normal or displacement work processes of closed systems, Shear or shaft work processes of closed systems	
6	**Thermodynamic Property Diagrams:** p-v-T equilibrium diagrams, Saturation properties, Enthalpy, Dryness fraction, Internal energy and enthalpy diagrams, Thermodynamic functions that characterize substances	CP Bock 02
7	**The Steam Tables:** Structure of the steam tables, Interpolation, Subcooled liquid (compressed liquid), Saturated vapour, Superheated vapour, Substance at supercritical pressure, Practical tips	
8	**Ideal Gases:** The ideal gas equation, Joule's law, Internal energy and enthalpy differences, processes of an ideal gas, Relationships between the ideal gas parameters, Practical tips	
9	**The Mass Balance Equation:** Steady flows, States and systems, Closed systems, Open systems	
10	**The First Law of Thermodynamics:** The first law of thermodynamics, Internal energy and the non-flow energy equation, First-law analysis of fluid friction, The adiabatic index for an ideal gas	
11	**The Steady Flow Energy Equation:** Conservation of energy in a steady flow system, The steady flow energy equation, The constant pressure heating or cooling process, The	CP Bock

	adiabatic throttling process, The adiabatic nozzle, Flow cycles, Practical tips	03
12	**Heat Engines:** Thermal reservoirs, Work reservoirs, The heat engine, Combustion engines, The heat engine operating in reverse	
13	**The Second Law of Thermodynamics:** The Clausius statement, The Kelvin-Planck statement, Immediate implications of the second law, Reversibility, Carnot's principle, Proof of Carnot's principle, The thermodynamic or absolute temperature scale, The thermal efficiency or c.o.p. of a reversible heat engine, The inequality of Clausius, Practical tips	
14	**Entropy:** The basis of entropy, The definition of entropy differences, Entropy changes for various processes, Heat transfer as a path function for a reversible process, The physical significance of entropy, The temperature versus specific entropy diagram, Entropy transfer and transport, Entropy and Work, The principle of increase of entropy, The entropy balance equation, Exergy analysis, Practical tips	CP Bock 04
15	**The Carnot Cycle:** Description of the Carnot cycle, The Carnot cycle for an ideal gas, The Carnot cycle for a two-phase working fluid	
16	**The Rankine Steam Cycle**: The processes of the Rankine cycle, Cycle calculations, Cycle thermal efficiency, Practical aspects of the Rankine steam cycle, Practical tips	
17	**The Air Standard Otto Cycle**: Assumptions, The air standard Otto cycle, Cycle analysis, Thermal efficiency, Practical aspects of the air standard Otto cycle, Practical tips	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML072-TB1	The Essence of Engineering Thermodynamics, McGovern,	1st 1996	81-203-1193-0 Prentice Hall of India,
Reference-Books			
TML072-RB1			
CD / DVD			
TML072-CD1			
Web Links			
TML072-WL1			

TML073: Machine Design

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma

5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
07	TML073	Machine Design	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • All courses at Semester 5 • TML071 • TML072	After successful completion of this course, student should be able to • Explore basic concepts and techniques involved in machine design in real-world problem
Special Note: Booklet containing design formula and data will be provided during end exam on returnable basis.	

Units

UN	Name of the Unit	CSs	Questions
1 2 3	Introduction Manufacturing Considerations in Design Design Against Static Load	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4 5	Design against Fluctuating Load Threaded Joints	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
6 7	Shafts, Keys and Coupling Mechanical Springs	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
8 9 10	Brakes Belt Drives Chain Drives	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**Introduction:** Mechanical Engineering Design, Traditional Design Methods, Design Synthesis, Aesthetic Considerations in Design, Ergonomic Considerations in Design, Use of Standards in Design, Selection of Preferred Sizes	CP Bock 01

2	**Manufacturing Consideration in Design:** Tolerances, Types of Fits, B.I.S. System of Fits and Tolerances, Selection of Fits, Tolerances and Manufacturing Methods, Selective Assembly, Tolerances for Bolt Spacing, Surface Roughness	
3	**Design Against Static Load:** Modes of Failure, Factor of Safety, Stress-strain Relationship, Shear Stress and Shear Strain, Stresses due to Bending Moment, Stresses due to Torsional Moment, Eccentric Axial Loading, Principal Stresses, Theories of Failure, Maximum-Normal-Stress Theory, Maximum-Shear-Stress Theory	
4	**Design against Fluctuating Load:** Stress Concentration, Stress Concentration Factors, Reduction of Stress Concentration Effects, Fluctuating Stresses, Fatigue Failure, Endurance Limit, Notch Sensitivity, Endurance Limit-Approximate Estimation, Reversed Stresses-design for Finite and Infinite Life, Cumulative Damage in Fatigue, Soderberg and Goodman Diagrams, Modified Goodman Diagrams, Fatigue Design Under Combined Stresses	**CP Bock 02**
5	**Threaded Joints:** Threaded Joints, I.S.O. Metric Screw Threads, Bolted Joint in Tension, Torque Requirement for Bolt Tightening, Bolted Joint under Fluctuating Load, Eccentrically Loaded Bolted Joints in Shear, Bolted Joint with Combined Stresses	
6	**Shafts, Keys and Coupling:** Transmission Shafting, Design against Static Load, Design for Torsional Rigidity, Keys, Design of Square and Flat Keys, Design of Kennedy Key, Splines, Couplings, Rigid Coupling, Flexible Coupling	**CP Bock 03**
7	**Mechanical Springs:** Mechanical Springs, Helical Springs-Stress Equation, Helical Spring-Deflection Equation, Spring Materials, Styles of End, Design against Static Load , Design against Fluctuating Load, Optimum Design of Helical Spring , Helical Torsion Springs , Multi-leaf Springs, Nipping of Leaf Springs , Shot Peening	
8	**Brakes:** Brakes, Energy Equations, Block Brake with Short Shoe, Pivoted Block Brake with Long Shoe, Internal Expanding Brake, Band Brakes, Thermal Considerations	**CP Bock 04**
9	**Belt Drives:** Flat and V-belts, Belt Constructions, Geometrical Relationships, Analysis of Belt Tensions, Condition for Maximum Power, Selection of Flat-be1ts from the Manufacturer's Catalogue, Selection of V-belts, Adjustment of Belt Tensions	
10	**Chain Drives:** Chain Drives, Roller Chains, Geometric Relationships, Polygonal Effect, Power Rating of Roller Chains, Sprocket Wheels, Silent Chain	

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML073-TB1	Design of Machine Elements, Bhandari,	17th 2003	0-07-460060-5 Tata McGraw-Hill,
Reference-Books			
TML073-RB1			
TML073-RB2			
CD / DVD			
TML073-CD1			
Web Links			

TML073-WL1			

TML074: Theory of Machines

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
07	TML074	Theory of Machines	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML041 • TML052 • TML073	After successful completion of this course, student should be able to • Explain and relate theoretical concepts and principles of machines in logical manner in a real world problem

Units

UN	Name of the Unit	CSs	Questions
1 2	Mechanism and Machines Velocity Analysis	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3 4 5 6	Acceleration Analysis Computer-Aided Analysis of Mechanisms Graphical Synthesis of Mechanisms Lower Pairs	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

7 8	Cams Friction	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
9 10	Belts, Ropes and Chains Static Force Analysis	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Mechanism and Machines:** Introduction, Mechanism and Machine, Rigid and Resistant Bodies, Link, Kinematic Pair, Degrees of Freedom, Classification of Kinematic Pairs, Kinematic Chain, Linkage, Mechanism, and Structure, Classification of Mechanisms, Equivalent Mechanisms, Four-Link (BAR) Mechanism, Inversions of Slider-Crank Chain, Double-Slider-Crank Chain	CP Bock 01
2	**Velocity Analysis:** Introduction, Absolute and Relative Motions, Vectors, Addition and Subtraction of Vectors, Motion of a Link, Four-Link Mechanism, Angular Velocity of Links, Velocity of Rubbing, Slider-Crank Mechanism, Crank and Slotted Lever Mechanism, Instantaneous Centre (I-Centre), Notation, Number of I-Centres, Kennedy's Theorem, Locating I-Centres, Angular Velocity by I-Centre Method	
3	**Acceleration Analysis:** Acceleration, Four-Link Mechanism, Angular Acceleration of Links, Acceleration of Intermediate and Offset Points, Slider-Crank Mechanism	CP Bock 02
4	**Computer-Aided Analysis of Mechanisms:** Introduction, Four-Link Mechanism, Slider-Crank Mechanism, Coupler Curves	
5	**Graphical Synthesis of Mechanisms:** Pole, Relative Pole, Design of Mechanisms by Relative Pole Method, Inversion Method, Design of Mechanisms by Inversion Method	
6	**Lower Pairs:** Introduction, Pantograph, Straight Line Mechanisms, Engine Indicators	
7	**Cams:** Introduction, Types of Cams, Types of Followers, Definitions, Follower Displacement Programming, Motions of the Follower, Cams with Specified Contours	CP Bock 03
8	**Friction:** Introduction, Kinds of Friction, Laws of Friction, Coefficient of Friction, Inclined Plane, Screw Threads, Wedge	
9	**Belts, Ropes and Chains:** Introduction, Belt and Rope Drives, Open- and Crossed-Belt Drives, Action of Belt on Pulleys, Velocity Ratio, Slip, Material for Belts and Ropes, Crowning of Pulleys, Types of Pulleys, Law of Belting, Length of Belt, Cone (Stepped) Pulleys, Ratio of Friction Tensions, Power Transmitted, Centrifugal Effect on Belts, Maximum Power Transmitted by a Belt Initial Tension, Creep, Chains, Chain Length, Angular Speed Ratio, Classification of Chains	CP Bock 04
10	**Static Force Analysis:** Introduction, Static Equilibrium, Equilibrium of Two-Force and Three-Force Members, Member with Two Forces and a Torque, Force Convention, free Body Diagrams, Superposition, Principle of Virtual Work, Friction in Mechanisms	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML074-TB1	Theory of Machines, Rattan,	17th 2003	0-07-460320-5 Tata McGraw-Hill,
Reference-Books			
TML074-RB1			
TML074-RB2			
CD / DVD			
TML074-CD1			
Web Links			
TML074-WL1			

TML075: Machine Design and Theory of Machines

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T50: Diploma in Production Engineering (DPE) T51: Diploma in Automobile Engineering (DAE) T52: Diploma in Thermal Engineering (DTE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
07	TML075	Machine Design and Theory of Machines	4	60	120	100	P

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML073 • TML074	After successful completion of this course, student should be able to • understand operation and use of I.C. engine, safety valve, pulleys, couplings and jacks • prepare assembly drawing using Auto-CAD

Detail Syllabus

Note:

Work Book shall consist of a record in the form of a journal consisting of the list of activities and necessary documentation for the following exercises. Students are expected to perform all activities and get workbook certified from the Practical Lab Instructor.

UN	Name of the Practical Activity	CSs	Questions
1	Four problems on velocity and acceleration by relative velocity method and instantenous centre method to be solved graphically on sheet	CP Block 01 CSs 01-30	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
2	To determine velocity and acceleration of slider in slider crank mechanism by kleins construction		
3	To draw cam profiles for a) SHM b) Uniform acceleration & deceleration both for knife edge and roller followers		
4	Determining rotating mass to balance different rotating masses on different planes on an experimental four plane balancing machine		
5	To analyse sources of unbalancing in working model of single Cylinder I.C. engine		
6	Designing and drawing sheet on ay one of following - i) Cotter joint or kuncle joint or turnbuckle ii) Dead weight safety valve, or spring loaded safety valve or lever safety valve - 1	CP Block 02 CSs 31-60	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
7	Designing and drawing sheet on ay one of following - i) Cotter joint or kuncle joint or turnbuckle ii) Dead weight safety valve, or spring loaded safety valve or lever safety valve – 2		
8	Designing and drawing sheet on ay one of following - i) Cotter joint or kuncle joint or turnbuckle ii) Dead weight safety valve, or spring loaded safety valve or lever safety valve - 3		
9	Designing and drawing sheet on any one of following – i) Line shaft supported in bearing with one or two pulleys ii) Rigid or flexible coupling iii) Bolted or welded joint subjected to eccentric loading - 1		
10	Designing and drawing sheet on any one of following – i) Line shaft supported in bearing with one or two pulleys ii) Rigid or flexible coupling iii) Bolted or welded joint subjected to eccentric loading – 2		
11	Designing and drawing sheet on any one of following – i) Line shaft supported in bearing with one or two pulleys ii) Rigid or flexible coupling iii) Bolted or welded joint subjected to eccentric loading - 3	CP Block 03 CSs 61-90	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
12	Designing and drawing sheet on any one of following - i) Screw jack ii) C-clamp iii) Toggle jack - 1		
13	Designing and drawing sheet on any one of following - i) Screw jack ii) C-clamp iii) Toggle jack - 2		

14	Designing and drawing sheet on any one of following - i) Screw jack ii) C-clamp iii) Toggle jack - 3		
15	CAD Drawing: Two assignments on preparation of assembly drawing on Auto-CAD from drawings covered in above sheets - 1		
16	CAD Drawing: Two assignments on preparation of assembly drawing on Auto-CAD from drawings covered in above sheets – 2	CP Block 04 CSs 91-120	Students have to submit 'Activity Report in Work-Book Format' in CA and Perform 'Practical Activity' and face Viva for end exam on these units.
17	CAD Drawing: Two assignments on preparation of assembly drawing on Auto-CAD from drawings covered in above sheets – 3		
18	CAD Drawing: Two assignments on preparation of assembly drawing on Auto-CAD from drawings covered in above sheets – 4		
19	Techno-commercial Information on I.C. engine, safety valve, pulleys, couplings and jacks		
20	Techno-commercial Information on Auto-CAD softwares available in the market.		

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML075-TB2	-	-	-
Reference-Books			
TML075-RB1			
CD / DVD			
TML075-CD1			
Web Links			
TML075-WL1			

Semester 08

TML101: Automobile Engineering-1

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering

4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T51: Diploma in Automobile Engineering (DAE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
08	TML101	Automobile Engineering-1	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML072 • TML063 • TML064	After successful completion of this course, student should be able to • Repair, Troubleshoot and Maintain an Automobile • Identify and distinguish different systems and components in an Automobile

Units

UN	Name of the Unit	CSs	Questions
1 2	Combustion in SI Engines Combustion in CI Engines	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
3	Testing and Performance	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4 5 6 7	Automotive Engines Engine Disassembly Short Blocks Cylinder Heads and Valves	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
8 9 10	Cam Shafts and Valve Trends Lubricating and Cooling Systems In-Take and Exhaust Systems	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**Combustion in SI Engines:** Introduction, Ignition limits, Stages of Combustion in SI engine, Concept of combustion quality, Effect of engine variables on ignition lag, Effect of engine variables on flame propagation, Rate of pressure rise, Cycle variations, Abnormal combustion, Detonation or knocking, Effects of detonation, Theories of detonation, Chemistry of knock or detonation, Effect of engine variables on knock or	CP Bock 01

	detonation, Control of detonation, Knock evaluation in a CFR engine, Abnormal combustion knock-surface ignition, Observation of burning gas by high speed cinematography, SI engine combustion chamber designs, Combustion chamber design principles, Historical review of combustion chamber designs, Overhead value or I-head combustion chamber, F-head combustion chambers, Very high output combustion chamber engines	
2	**Combustion in CI Engines:** Introduction, Combustion in the CI engine, Air-fuel ratio in CI engines, Delay period or ignition lag, Variables affecting delay period, Diesel knock, Methods of controlling diesel knock (reducing delay period), The CI engine combustion chambers, Induction swirl and open combustion chambers, Compression swirl and divided or turbulent swirl chambers, Combustion induced swirl and divided (turbulent) chambers, 'M' combustion chamber, Cold starting of CI engines, Cold starting aids	
3	**Testing and Performance:** Introduction, Performance parameter, Basic measurements, Measurements of speed, Fuel consumption measurement, Measurement of air consumption, Measurement of exhaust smoke, Measurement of exhaust emission, Measurement of brake power, Measurement of friction power, Measurement of indicated power, High speed indicator diagrams and combustion research, Blowby measurement, Performance of SI engines, Performance of CI engines, Performance maps	**CP Bock 02**
4	**Automotive Engines:** Introduction to Engines, Engine Classifications, Engine Measurement and Performance, Engine Identification, Engine Diagnostics, Evaluating the Engine's Condition, Noise Diagnosis, Other Engine Designs	**CP Bock 03**
5	**Engine Disassembly:** Preparing the Engine for Removal, Lifiting an Engine, Engine Disassembly and Inspection, Cleaning Engine Parts, Crack Repair	
6	**Short Blocks:** Cylinder Block Reconditioning, Crankshaft, Crankshaft Inspection and Rebuilding, Installing Main Bearings and Crankshaft, Piston and Piston Rings, Installing Pistons and Connecting Rods	
7	**Cylinder Heads and Valves:** Intake and Exhaust Valves, Aluminum Cylinder Heads, Resurfacing Cylinder Heads, Grinding Valves, Valve Guide Reconditioning, Reconditioning Valve Seats, Valve Stem Seals, Assembling the Cylinder Head	
8	**Cam Shafts and Valve Trends:** Camshaft and Valve Train Inspection, Installing the Camshaft, Installing the Cylinder Head and Valve Train, Adjusting Valves, Installing the Timing Components	**CP Bock 04**
9	**Lubricating and Cooling Systems:** Oil Pump Inspection and Service, Installing the Oil Pump, Cooling Systems, Cooling System Servicing	
10	**In-Take and Exhaust Systems:** The Air Induction System, Exhaust System Components, Exhaust System Service, Turbochargers and Superchargers	

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML101-TB1	Internal Combustion Engine, M.L.Mathur, R.P. Sharma,	Reprint 2002	Dhanpat Rai Publications,

TML101-TB2	Automotive Technology: A Systems Approach, Erjavec,	3rd 2000 **SYE**	0-7668-0673-1 Thomson Learning,
Reference-Books			
TML101-RB1			
CD / DVD			
TML101-CD1			
Web Links			
TML101-WL1			

TML102: AUTOMOBILE ENGINEERING-2

PROGRAMME INFORMATION

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T51: Diploma in Automobile Engineering (DAE)

COURSE INFORMATION

Sem	Code	Course Name	CP	CST	ST	Marks	Type
08	TML102	Automobile Engineering-2	4	45	120	100	TH

PRESUMED KNOWLEDGE AND LEARNING OBJECTIVES

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML101	After successful completion of this course, student should be able to • Identify and distinguish different systems and components in an Automobile • Repair, Troubleshoot and Maintain an Automobile

UNITS

UN	Name of the Unit	CSs	Questions
1 2	Engine Sealing and Reassembly Basics of Electrical System	**CP Block 01 CSs 01-10**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

3 4 5	Basics of Electronics Batteries: Theory and Service Starting Systems	**CP Block 02 CSs 11-20**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
6 7 8	Charging Systems Lighting Systems Electrical Instruments and Accessories	**CP Block 02 CSs 21-30**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
9 10	Ignition Systems Ignition System Service	**CP Block 02 CSs 31-40**	Students have to answer '1 of 1' SAQ in CA **and** '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Engine Sealing and Reassembly:** Thread Repair, Gaskets, Adhesives, Sealants, and Other Chemical Sealing Materials	**CP Bock 01**
2	**Basics of Electrical System:** Basics of Electricity, Electrical Terms, Conductors and Insulators, Electromagnetism Basics	
3	**Basics of Electronics:** Computers, Integrated circuits, Operation of Microprocessors, Multiplexing, Protecting, Protecting Electronic Systems, Testing Electronic Circuits and Systems, Case Study	**CP Bock 02**
4	**Batteries: Theory and Service:** Conventional Design Battery, Low-Maintenance and Maintenance-Free Batteries, Hybrid Batteries, Recombination Batteries, Battery Voltage and Capacity, Battery Rating Methods, Battery Size Selection, Factors Affecting Battery Life, Safety Procedures, Routine Inspections, Routine Cleaning, Battery Testing, Battery Charging, Jump-Starting, Case Study	
5	**Starting Systems:** Starting System-Design and Components, Control Circuit, Starting System Testing, Case Study	
6	**Charging Systems:** Induced Voltage, Alternating Current Charging Systems, Preliminary, Checks, AC Generator Service, Case Study	**CP Bock 03**
7	**Lighting Systems:** Lamps, Headlights, Light Bulbs, Lighting Maintenance, Case Study	
8	**Electrical Instruments and Accessories:** Instrument Panels, Instrument Gauges, Basic Information Gauges, Electrical Accessories	
9	**Ignition Systems:** Purpose of the Ignition System, Ignition Timing, Basic, Circuitry, Ignition Components, Spark Timing, Systems, Switching Systems, Distributor Ignition, System Operation, Electronic Ignition System Operation, Case Study	**CP Bock 04**
10	**Ignition System Service:** General Ignition System Diagnosis, Visual Inspection of Ignition Systems, No-Start Diagnosis, General Testing, Testing with a Scope, Effects of Improper Timing, Setting Ignition Timing, DI and EI Systems, Primary Circuit Components, Distributor Service, Secondary Component Tests and Service, Specific EI System Service,	

	Case Study	

Learning Resource Details

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML102-TB1	Automotive Technology: A Systems Approach, Erjavec,	3rd 2000 **SYE**	0-7668-0673-1 Thomson Learning,
Reference-Books			
TML102-RB1			
CD / DVD			
TML102-CD1			
Web Links			
TML102-WL1			

TML103: Automobile Engineering-3

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T51: Diploma in Automobile Engineering (DAE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
08	TML103	Automobile Engineering-3	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML101 • TML102	After successful completion of this course, student should be able to • Identify and distinguish different systems and components in an Automobile • Repair, Troubleshoot and Maintain an Automobile

Units

UN	Name of the Unit	CSs	Questions

1 2 3 4	Fuel Systems Fuel System Diagnosis and Service Carburetors Carburetor Diagnosis and Service	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
5 6 7	Electronic Fuel Injection Fuel Injection System Diagnosis and Service Emission Control Systems	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
8 9 10	Emission Control Diagnosis and Service On-Board Diagnostic Systems On-Board Diagnostic System Diagnosis and Service	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
11 12 13	Clutches Manual Transmissions and Transaxles Manual Transmissions / Transaxles Service	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

DETAIL SYLLABUS

UN	Detail Syllabus of the Unit	CP Block
1	**Fuel Systems**: Fuel Performance, Basic Fuel Additives, Alternative Fuels, Fuel Delivery System, Case Study	CP Bock 01
2	**Fuel System Diagnosis and Service:** Alcohol-in-Fuel Test, Fuel System Pressure Relief, Fuel Tanks, Fuel Lines, Fuel Filters, Fuel Pumps, Case Study	
3	**Carburetors:** Basic Carburetor Design, Basic Carburetor Circuits, Carburetor Systems, Type of Carburetors, Feedback Carburetor Systems, Electronic Idle-Speed Control	
4	**Carburetor Diagnosis and Service**: Carburetor Diagnosis, Electronic Control Diagnostics, Carburetor Service, Case Study	
5	**Electronic Fuel Injection:** Types of Fuel Injection, Continuous Injection Systems Basic EFI, Throttle Body Fuel Injection, Port Fuel Injection, Sequential Fuel Injection Systems, Central Multi-Port Fuel Injection (CMFI), Gasoline Direct-Injection System, Input Sensors, Case Study	CP Bock 02
6	**Fuel Injection System Diagnosis and Service:** Preliminary Checks, Basic EFI System Checks, CIS Checks and Tests, Case Study	
7	**Emission Control Systems:** Legislative History, Pollutants, Evaporative Emission Control Systems, Precombustion Systems, Post-Combustion System, Case Study	
8	**Emission Control Diagnosis and Service:** PCV System Diagnosis and Service, EGR System Diagnosis and Service, Spark Control Systems, Intake Heat Control Diagnosis and Service, Catalytic Converter Diagnosis, Air Injection System Diagnosis and Service, Evaporative Emission Control System Diagnosis and Service, Case Study	CP Bock 03

9	**On-Board Diagnostic Systems:** System Functions, System Components, Primary Sensors, Computer Outputs and Actuators, System Operation, OBD II Standards, Monitoring, Capabilities, OBD II Diagnostics, OBD II Terms, Case Study	
10	**On-Board Diagnostic System Diagnosis and Service:** Electronics Service Precautions, Basic Diagnosis of Electronic Engine Control Systems, Self-Diagnostic Systems, Retrieving Trouble Codes, OBD II System Diagnosis and Voltage Supply and Ground Wires, Testing Input Sensors, Variable Resistor-Type Sensors, Generating Sensors, Testing Actuators, Case Study	
11	**Clutches:** Operation, Flywheel, Clutch Service Safety Precautions, Clutch Maintenance, Clutch Problem Diagnosis, Clutch Service, Case Study	**CP Bock 04**
12	**Manual Transmissions and Transaxles:** Transmission versus Transaxle, Gears, Basic Gear Theory, Transmission/Transaxle Design, Synchronizers, Gearshift Mechanisms, Transmission Power Flow, Five-Speed Overdrive, Transaxle Power Flows, Final Drive Gears and Overall Ratios, Electrical Systems, Case Study	
13	**Manual Transmissions / Transaxles Service:** Lubricant Check, Diagnosing Problems, Transmission/Transaxle Removal, Cleaning and Inspection, Disassembly and Reassembly of the Differential Case, Reassembly/Reinstallation of Transmission/Transaxle, Case Study	

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML103-TB1	Automotive Technology: A Systems Approach, Erjavec,	3rd 2000 **SYE**	0-7668-0673-1 Thomson Learning,
Reference-Books			
TML103-RB1			
TML103-RB2			
CD / DVD			
TML103-CD1			
Web Links			
TML103-WL1			

TML104: AUTOMOBILE ENGINEERING-4

PROGRAMME INFORMATION

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma

5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T51: Diploma in Automobile Engineering (DAE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
08	TML104	Automobile Engineering-4	4	45	120	100	TH

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML101 • TML102 • TML103	After successful completion of this course, student should be able to • Identify and distinguish different systems and components in an Automobile • Repair, Troubleshoot and Maintain an Automobile

Units

UN	Name of the Unit	CSs	Questions
1 2 3	Drive Axles and Differentials Heating and Air Conditioning Heating and Air Conditioning Service	CP Block 01 CSs 01-10	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
4 5 6	Four and All Wheel Drive Tires and Wheel Suspension Systems	CP Block 02 CSs 11-20	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
7 8 9	Steering Systems Wheel Alignment Brake Systems	CP Block 02 CSs 21-30	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.
10 11 12	Drum Brakes Disc Brakes Antilock Brake Systems	CP Block 02 CSs 31-40	Students have to answer '1 of 1' SAQ in CA and '1 of 1' SAQ & '1 of 2' LAQs in end exam on these units.

Detail Syllabus

UN	Detail Syllabus of the Unit	CP Block
1	**Drive Axles and Differentials:** Front-Wheel-Drive (FWD) Axles, Types of CV Joints, Front-Wheel-Drive Applications, CV Joint Service, CV Joint Service Guidelines, Rear-Wheel-Drive Shafts, Operation of U-Joints, Types of U-Joints, Diagnosis of Drive Shaft and U-Joint Problems, Differentials and Drive Axles, Limited Slip Differentials, Axle Shafts, Servicing the Final Drive Assembly, Diagnosing Differential Noises, Case Study	CP Bock 01

2	**Heating and Air Conditioning:** Ventilation System, Automotive Heating Systems, Theory of Automotive Air Conditioning, Refrigerants in Air Conditioning Systems, The Air Conditioning System and Its Components, Air Conditioning Systems and Controls, Temperature Control Systems, Case Study	
3	**Heating and Air Conditioning Service:** Refrigerant Safety Precautions, Guidelines for Converting (Retrofitting) R – 12 Systems to R-134A, Air Conditioner Testing and Servicing Equipment, Service Procedure, Diagnostic and Troubleshooting Procedures, Electrical System Inspection, Heating System Service, Case Study	
4	**Four and All Wheel Drive:** Four-Wheel Drive versus All-Wheel Drive, Four-Wheel-Drive System, Transfer Case, Locking/Unlocking Hubs, Operational Modes, Four-Wheel-Drive Passenger Cars, Servicing Four-Wheel-Drive Vehicles, All-Wheel-Drive Systems, Case Study	
5	**Tires and Wheel:** Wheels, Tires, Tire Repair, Tire/Wheel Runout, Tire/Wheel Assembly Service, Wheel Bearings, Case Study	**CP Bock 02**
6	**Suspension Systems:** Frames, Suspension System Components, McPherson Strut Suspension Components, Independent Front Suspension, General Front-Suspension Inspection, Front-Suspension Component Servicing, Rear-Suspension Systems, Live-Axle Rear-Suspension Systems, Semi-Independent Suspension, Independent Suspension, Electronically Controlled Suspensions, Servicing Electronic Suspension Components, Active Suspensions, Case Study	
7	**Steering Systems:** Power-Steering Systems, Electronically Controlled Power-Steering Systems, Steering System Diagnosis, Visual Inspection, Four-Wheel Steering Systems	
8	**Wheel Alignment:** Alignment Geometry, Prealignment Inspection, Wheel Alignment Equipment, Alignment Machines, Adjusting Wheel Alignment, Four-Wheel-Drive Vehicle Alignment, Case Study	**CP Bock 03**
9	**Brake Systems:** Friction, Principles of Hydraulic Brake Systems, Hydraulic Brake System Components, Master Cylinder Operation, Hydraulic Tubes and Hoses, Hydraulic System Safety Switches and Valves, Drum and Disc Brake Assemblies, Hydraulic System Service, Pushrod Adjustment, Hydraulic Bake Boosters, Case Study	
10	**Drum Brakes:** Drum Brake Operation, Drum Brake Components, Drum Brake Designs, Road Testing Brakes, Drum Brake Inspection, Brake Shoes and Linings, Wheel Cylinder Inspection and Servicing, Drum Parking Brakes, Integral Parking Brakes, Case Study	
11	**Disc Brakes:** Disc Brake Components and Their Functions, Disc Brake Diagnosis, Service Precautions, General Caliper, Inspecting and Servicing, Rotor Inspecting and Servicing, Case Study	**CP Bock 04**
12	**Antilock Brake Systems:** Antilock Brakes, ABS Components, Types of Antilock Brake Systems, ABS Operation, Automatic Traction Control, Automatic Stability Control, Antilock Brake System Service, Diagnosis and Testing, Case Study	

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			

TML104-TB1	Automotive Technology: A Systems Approach, Erjavec,	3rd 2000 **SYE**	0-7668-0673-1 Thomson Learning,
Reference-Books			
TML104-RB1			
TML104-RB2			
CD / DVD			
TML104-CD1			
Web Links			
TML104-WL1			

TML105: Automobile Engineering

Programme Information

SN	Description	Details
1	University	Yashwantrao Chavan Maharashtra Open University Nashik - 422 222, Maharashtra, India Website: http://www.ycmou.com/
2	School	School of Architecture, Science and Technology
3	Discipline	Technology/Engineering
4	Level	Diploma
5	Course Used in	T24: Diploma in Mechanical Engineering (DME) T51: Diploma in Automobile Engineering (DAE)

Course Information

Sem	Code	Course Name	CP	CST	ST	Marks	Type
08	TML105	Automobile Engineering-1	4	60	120	100	P

Presumed Knowledge and Learning Objectives

Presumed Knowledge	Learning Objectives
For successful completion of this course, student should have successfully completed: • TML101 • TML102 • TML103 • TML104	After successful completion of this course, student should be able to • understand operation and use of clutch, gears, steers and brakes assembly used in 2 and 4 wheelers

Detail Syllabus

Note:

Work Book shall consist of a record in the form of a journal consisting of the list of activities and necessary documentation for the following exercises. Students are expected to perform all activities and get workbook certified from the Practical Lab Instructor.

UN	Name of the Practical Activity	CSs	Questions
1	Visit to Automobile Manufacturing Industry - Understanding to Role of different sections	**CP Block**	Students have to submit 'Activity Report in Work-

2	Visit to Automobile Manufacturing Industry - Role of Manufacturing System	**01** **CSs 01-30**	Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
3	Visit to Automobile Manufacturing Industry - Role of technician in Manufacturing System		
4	Assembly of Clutch assembly of 2 wheeler		
5	Dessembly of Clutch assembly of 2 wheeler		
6	Assembly of Clutch assembly of 4 wheeler	**CP Block 02** **CSs 31-60**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
7	Dessembly of Clutch assembly of 4 wheeler		
8	Assembly of gear box		
9	Dessembly of gear box		
10	Assembly of propeller shaft, rear axle, Differential gear box		
11	Dessembly of propeller shaft, rear axle, Differential gear box	**CP Block 03** **CSs 61-90**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
12	Assembly of steering system		
13	Dessembly of steering system		
14	Assembly of braking system		
15	Dessembly of braking system		
16	Assembly of different types of shock absorbers	**CP Block 04** **CSs 91-120**	Students have to submit 'Activity Report in Work-Book Format' in CA **and** Perform 'Practical Activity' and face Viva for end exam on these units.
17	Dessembly of different types of shock absorbers		
18	Visit to 4 wheeler Service Station		
19	Techno-commercial Information on 2 wheeler available in the market with their features and specifications		
20	Techno-commercial Information on 4 wheeler available in the market with their features and specifications		

LEARNING RESOURCE DETAILS

LR Code	Title Author	Edition Year	ISBN Publisher
Text-Books			
TML105-TB2	-	-	-
Reference-Books			
TML105-RB1			
CD / DVD			
TML105-CD1			
Web Links			
TML105-WL1			

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