MUZAFFARPUR INSTITUTE OF TECHNOLOGY, Muzaffarpur

COURSE FILE

OF

MECHANICAL SYSTEM DESIGN

(021821)

Faculty Name:

Mr. Shobhit Gusain

ASSISTANT PROFESSOR, DEPARTMENT OF MECHANICAL ENGINEERING

Content

VISION OF THE DEPARTMENT

To strengthen the region through imparting superior quality technical education and research; which enables the fulfillment of industrial challenge and establish itself as a Centre of Excellence in the field of Mechanical Engineering.

MISSION OF DEPARTMENT

- To build an academic environment of teaching and lifelong learning for students to make them competitive in context with advance technological, economical and ecological changes.
- To enable the students to enhance their technical skills and communications through research, innovation and consultancy projects.
- To share and explore the accomplishments through didactic, enlightenment, R & D programs with technical institution in India and abroad.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

After 4 to 5 years of graduation a BE (ME) graduate would be able to :

- Use core competence acquired in various areas of Mechanical engineering to solve techno managerial issues for creating innovative products that leads to better livelihoods and economy of resources.
- To establish themselves as effective collaborators and innovators to address technical, managerial and social challenges.
- To equip students for their professional development through lifelong learning and career advancement along with their organizational growth.
- To serve as a driving force for proactive changes in industry, society and nation.

PROGRAMME OUTCOMES (PO)

Students who complete the B.E. degree in ME will have :

- An ability to apply the knowledge of mathematics, basic sciences and engineering concepts to solve the complex engineering problems.
- The ability to conduct experiments and to critically analyze and interpret the experimental data to reach at substantial outcomes.
- An ability to design systems, components, or processes to meet appropriate needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- An ability to identify, formulates, and solves the complex engineering problems.
- An ability to function on multi-disciplinary teams that leads the multi-disciplinary projects.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively with written, oral, and visual means.
- An ability to understand the impact of engineering solutions in a global, environmental, economical and societal context.
- An ability to recognize the need to engage in life-long learning.
- An ability to attain knowledge of contemporary issues.

- An ability to use the techniques, skills, and modern tools necessary for Mechanical engineering practice.
- Possess ability to estimate costs, estimate quantities and evaluate materials for design and manufacturing purposes.

Institute / College Name :	MUZAFFARPUR INSTITUE OF TECHNOLOGY		
Program Name	**B.E. MECHANICAL**		
Course Code	021821		
Course Name	MECHANICAL SYSTEM DESIGN		
Lecture / Tutorial (per week):	3/0	**Course Credits**	3
Course Coordinator Name	MR. SHOBHIT GUSAIN		

1. Scope and Objectives of the Course

The main objective of any engineering design course is the fulfillment of some human need or desire. Broadly, engineering may be described as a judicious blend of science and art in which natural resources, including energy sources, are transformed into useful products, structures, or machines that benefit mankind. Science may be defined as any organized body of knowledge. Art may be thought of as a skill or set of skills acquired through a combination of study, observation, practice, and experience, or by intuitive capability or creative insight. Thus engineers utilize or apply scientific knowledge together with artistic capability and experience to produce products or plans for products.

At the end of this subject, the students should be able to understand

1. Mechanical engineering design theory to design, create and select components of complete mechanical systems from the recognition of need and definition of design objectives, design innovation. Concept of yielding and fracture.
2. To understand the principles involved in evaluating the shape and dimensions of a component.
3. To satisfy functional and strength requirements of machine elements.
4. Setting up and solving of structured and unstructured design problems, stages of design..
5. To learn to use standard practices and standard data used in industries

MAPPING OF COs AND Pos

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	3	3	-	-	-	-	-	1	2	2
CO2	3	3	3	2	1	-	-	-	-	1	-	2
CO3	3	2	2	3	-	-	-	-	-	3	-	2
CO4	3	3	4	2	-	-	2	1	-	1	1	2
CO5	3	3	2	2	-	-	2	1	-	2	1	3

Correlation level: 1- slight (Low) 2- moderate (Medium) 3-substantial (High)

SYLLABUS

Lecture Number	Date of Lecture	Topics	Web Links for video lectures	Text Book / Reference Book / Other reading material	Page numbers of Text Book(s)
1-2		**Introduction**		TB1, RB3	1-9
		Basic concepts of strength of materials and design of machine elements	https://www.youtube.com/watch?v=QAZk-UDuPPA		
3-8		**Design of IC engine components**		TB1, RB3	10-52
		Design of Cylinder, trunk piston, connecting rod, crank shaft, value gear	https://www.youtube.com/watch?v=2TvYuTc8_K8	https://www.researchgate.net/publication/282356039_MECHANICAL_DESIGN_OF_INTERNAL_COMBUSTION_ENGINE	
9-10		**Design of flywheel**		TB1, RB3	53-69
		Working principle and requirement of flywheel, design of flywheel	https://www.youtube.com/watch?v=oZhR1HPdvR4	http://nptel.ac.in/courses/112106137/pdf/3_7.pdf	
Assignment I					
11-13		**Design of centrifugal pump**		TB1, RB3	70-140

		Working principle, Efficiency and losses, specific speed, design of centrifugal pump	https://www.youtube.com/watch?v=rry25GfbUMo	http://nptel.ac.in/courses/103104043/25 file:///C:/Users/hp/Downloads/BACHELOR%20THESIS_Centrifugal%20pumps_Christian%20Allerstorfer%20(m0535041)%20v1.3.pdf	
14-17		**Design of hydraulic press**		TB1, RB3	141-202
		Working principle, classification and design of hydraulic press	https://www.youtube.com/watch?v=TjzKpke0nSU	http://nptel.ac.in/courses/112105046/m8L32.pdf	
Mid-Semester Exam (Syllabus covered from 1-17 lectures)					
18-22		**Design of bearings**		TB1, RB3	141-202
		Bearing types, selection and designation of bearings, design of journal bearing, ball bearing and roller bearing	https://www.youtube.com/watch?v=q4E9yaulqyc https://www.youtube.com/watch?v=64EfZpMuOho https://www.youtube.com/watch?v=ALPKXoclcaw&t=14s	http://nptel.ac.in/courses/105104103/3 http://nptel.ac.in/courses/105104103/4 http://nptel.ac.in/courses/112106137/pdf/5_1.pdf	
23-29		**Design of gears**		TB1, RB3	203-291
		Gear tooth profiles, involute profile basics, Influence of number of teeth and pressure angle, Analysis of forces on spur, and helical gears, design of spur gear and helical gear, Design of fixed ratio gear box-general, Worked out example on design of a single stage reduction gear unit	https://www.youtube.com/watch?v=Eqe_Y1cpZrU https://www.youtube.com/watch?v=KpIPcJxLIgQ https://www.youtube.com/watch?v=1a2DGySH2iI	http://nptel.ac.in/courses/112106137/14 http://nptel.ac.in/courses/112106137/20	
Assignment II					
30-35		**Design of chain drive and brackets**		TB1, RB3	292-324
		Classification of chains, chain tension, design of chain drive, design of brackets subjected to bending moment	https://www.youtube.com/watch?v=nMsB6Soz4Hc https://www.youtube.com/watch?v=nMsB6Soz4Hc	http://nptel.ac.in/courses/116102012/33 http://nptel.ac.in/courses/112105125/pdf/mod13les1.pdf	

GATE SYLLABUS:

Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.

MUZAFFARPUR INSTITUTE OF TECHNOLOGY

B.Tech. 8th (Eighth) Semester, Mechanical Engineering, (2014 Batch) TIME TABLE

MON	IndPoln (JY)	MIS (AK)	S.Devmt (PBH)	MSD (SG)	**B**	MSD LAB (SG)/S.Devmt-TUT. (PBH)
TUE	IndPoln (JY)	MSD (SG)	S.Devmt (PBH)	MIS (AK)	**R**	MSD LAB (SG)/S.Devmt-TUT. (PBH)
WED	IndPoln (JY)	MIS (AK)	S.Devmt (PBH)	MSD (SG)	**E**	PROJECT IT B (RKR,SK,NK)
THU	PROJECT 53 (PBH,AK,SG)				**A**	PROJECT IT B (MDI,JY,NKD)
FRI	PROJECT 53 (GK,MIH,NBH)				**K**	
SAT	IndPoln-TUT. (JY)					PROJECT 53 (ANK,SKY,AKN)

The first acronym is the subject and second acronym is the first and last initial of faculty names

STUDENT LIST:

1	13M44	RAHUL KUMAR
2	13M52	KUMAR CHANDRA DEV
3	14M01	PRANESH KUMAR SINGH
4	14M02	SHEETAL RANJAN SAH
5	14M03	ADIL FAZAL
6	14M04	PREETAM KUMAR
7	14M05	AMRITANSH ANAND
8	14M06	SHIVANI RAJ
9	14M07	PRANAV KUMAR
10	14M08	NADEEM ANSARI
11	14M09	SATISH ANAND
12	14M10	KIRTY RATAN
13	14M11	SUBIR KUMAR
14	14M12	SUMIT SAURAV
15	14M13	AMIT KUMAR
16	14M14	SHARAD BHASKAR
17	14M15	GAUTAM KUNAL BHARTI
18	14M16	MANJEET KUMAR
19	14M17	RAKESH KUMAR
20	14M18	HRISHIKESH JHA
21	14M19	ROHIT KUMAR
22	14M20	RAMA SHANKAR RAVI
23	14M21	MANISH KUMAR
24	14M23	GAURAV KUMAR
25	14M24	SONU KUMAR
26	14M25	TRISHANT KUMAR
27	14M26	MD IMBESAT ANSARI
28	14M27	HARI KANT UPADHYAY
29	14M28	NIKHIL ARK
30	14M29	NIKHIL KUMAR
31	14M30	SUBHANSHU MISHRA
32	14M31	SHUBHAM PANDEY
33	14M32	PANKAJ KUMAR
34	14M33	SUDHANSHU SAURAV
35	14M34	JAI HIND KUMAR
36	14M35	PANKAJ KUMAR
37	14M36	SHUBHAM VERMA
38	14M37	PINTU KUMAR
39	14M38	SURAJ KUMAR
40	14M39	AASHNA RAJ

41	14M40	MD IRSHAD
42	14M41	MANISH KUMAR JHA
43	14M43	RAJESH RANJAN
44	14M44	ABHISHEK KUMAR
45	14M45	PARAS KUMAR DEO
46	14M46	SANJEET KUMAR
47	14M47	SAURABH PANDEY
48	14M48	SANJEEV KUMAR
49	14M49	MODASSIR SABA NAJMI
50	14M50	RAHUL KUMAR
51	14M52	AYUSH PRIYAM
52	14M53	MAYANK
53	14M54	VISHAL KUMAR
54	14M56	ABHIJEET
55	14M57	RAMESH KUMAR
56	14M58	SAGEER KUMAR SANU
57	14M59	ASAF MOHAMMAD KHAN
58	14M60	PUNYANIDHI
59	14M61	RITESH KUMAR
60	14M62	AMISH RAJ
61	15(LE)M01	SOURAV BHARTI
62	15(LE)M02	VISHAL KUMAR
63	15(LE)M03	AFROJ ALAM
64	15(LE)M06	SANDEEP KUMAR
65	15(LE)M07	JIMMY KUMAR
66	15(LE)M08	RAJBIRENDRA RAVIDAS
67	15(LE)M09	AKHILESH KUMAR
68	15(LE)M10	RAJU RANJAN
69	15(LE)M11	ANKITA KUMARI
70	15(LE)M12	DIPAK KUMAR PASWAN

Textbooks

TB1: 'Design of Machine Elements' by V.B. Bhandari Sixth Edition, Standard Book House

TB2: Shigley's Mechanical Engineering Design, 9th Edition-McGraw-Hill.

Reference Books

1. Design Data hand Book, S MD Jalaludin, Anuradha Publishers

2. Machine Design / R.N. Norton

3. Data Books : Mahadevan

4. Mech. Engg. Design / JE Shigley

Other readings and relevant websites

S.No.	**Link of Journals, Magazines, websites and Research Papers**
1.	https://www.sciencedirect.com/science/article/pii/.../pdf?md5...pid=1-s2.0...1
2.	academic.uprm.edu/pcaceres/Courses/MatEng3045/EME8-4.pdf
3.	http://mechanicaldesign.asmedigitalcollection.asme.org/article.aspx?articleid=1451585
4.	imechanica.org/files/Fatigue%20SF.pdf
5.	https://link.springer.com/article/10.1007/s00170-014-6152-5
6.	https://eclass.upatras.gr/modules/document/file.php/MECH1178

COURSE PLAN

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Department of Mechanical Engineering
021821 Mechanical System Design
Assignment 1

1. Justify the application of I shaped cross-section in an IC engine connecting rod ($I_{xx}=4I_{yy}$).
2. A lightly loaded full journal bearing has journal diameter of 50mm, bush of 50.05mm and bush length of 20mm. If the rotational speed of journal is 1200 rpm and average viscosity of liquid lubricant is 0.03 Pas-sec, what will be the power loss due to friction.
3. The torque developed by an IC engine is given by $M = (1000 + 300 \sin 2\theta - 500 \cos 2\theta)$, where θ is the angle turned by the crank from inner dead centre. The engine speed is 300 rpm. The percentage fluctuation of speed with reference to the mean speed is limited to 0.9%. The radius of gyration is 400 mm. The flywheel rim is made of grey cast iron ($\rho=7500 kg/m^3$). The cross-section of the rim is square. Determine (a) power developed by the engine, (b) mass of the flywheel (c) angular acceleration of the flywheel when the crank has rotated 60° from the inner dead centre, and (d) dimensions of the cross-section of the flywheel rim.
4. A centrifugal pump delivers water against a net head of 14.5 meters and a design speed of 1000 rpm. The vanes are curved back to an angle of 30° with the periphery. The impeller diameter is 300 mm and the outlet width 50 mm. Determine the discharge of the pump if the manometric efficiency is 95%.

Department of Mechanical Engineering
021615 Design of Machine Elements
Assignment II

1. Define transmission shafts. Name and explain different types of transmission shafts.
2. Show that the hollow circular shaft whose inner diameter is half the outer diameter has a torsional strength equal to 15/16 of that of a solid shaft of the same outside diameter?
3. Determine the maximum shearing stress and elongation in a helical steel spring composed of 20 turns of 20-mm-diameter wire on a mean radius of 90 mm when the spring is supporting a load of 1.5 kN. G = 83 GPa.
4. Find the torque required to raise the load of 15kN and mean diameter of triple threaded screw being 46mm. Also given pitch=8mm and coefficient of friction is 0.15?
5. Design a clamp coupling to transmit 30 kW at 100 r.p.m. The allowable shear stress for the shaft and key is 40 MPa and the number of bolts connecting the two halves are six. The permissible tensile stress for the bolts is 70 MPa. The coefficient of friction between the muff and the shaft surface may be taken as 0.3.
6. Derive an expression for the maximum efficiency of a self locking screw.

MUZAFFARPUR INSTITUTE OF TECHNOLOGY, MUZAFFARPUR
B.Tech 8th Semester Mid-Term Examination, 2018
Mechanical System Design (021821)

Time: 2 hours **Full Marks: 20**

Instructions: (i) Attempt 4 out of 5 questions.
(iii) All questions carry equal marks.

Q.1. Choose the correct alternative:

1. The function of gudgeon pin is :
   a). Acts as stiffeners b). Supports piston head
   c. Connects piston to connecting rod d. All of the above
2. Which of the following materials are used for cylinder liners?
   a). Alloy cast iron b). Grey cast iron
   c). Both a. and b. d). None of the above
3. Single cylinder four stroke engine has brake power of 8 kW and brake mean effective pressure of 0.55 Mpa. What is the length of cylinder which is 1.2 times of bore diameter? (n = 3000 rpm)
   a). 110 mm b). 103 mm
   c). 70 mm d). 65 mm
4. The flywheel of a machine having weight of 4500 N and radius of gyration of 2 m has cyclic fluctuation of speed from 125 r.p.m to 120 r.p.m. Assuming g = 10m/s^2, the maximum fluctuation of energy is
   a) 12822 N-m b) 24200 N-m
   c) 14822 N-m d) 12100 N-m
5. The bearing which do not support any axial load is:
   a) Deep groove ball bearing b) Angular contact bearing
   c) Cylindrical roller bearing d) Thrust bearing

Q.2. The cylinder of a four stroke diesel engine has following specifications:
Brake power = 5kW, Speed= 600rpm, Indicated mean effective pressure = 0.5 Mpa.
Make suitable assumptions and calculate:

i. Bore and length of the cylinder
ii. Thickness of the cylinder liner
iii. Thickness of the cylinder head
iv. Size and number of studs

Q,3.(a). Mention the different parts of an IC engine piston. Explain with the help of neat diagram.
(b). Justify the application of I shaped cross-section in an IC engine connecting rod.

Q.4. The torque developed by an IC engine is given by M = (1000 + 300 sin 2θ - 500 cos2θ), where θ is the angle turned by the crank from inner dead centre. The engine speed is 300 rpm. The percentage fluctuation of speed with reference to the mean speed is limited to 0.9%. The radius of gyration is 400 mm. The flywheel rim is made of grey cast iron (ρ=7500kg/m^3). The cross-section of the rim is square. Determine (a) power developed by the engine, (b) mass of the flywheel (c) angular acceleration of the flywheel when the crank has rotated 60° from the inner dead centre, and (d) dimensions of the cross-section of the flywheel rim.

Q.5. A single-row deep groove ball bearing is subjected to a radial force of 8kN and a thrust load of 3kN. The shaft rotates at 1200 rpm. The expected life L_{10h} of the bearing is 20000hr. The minimum acceptable diameter of the shaft is 75mm. Select a suitable ball bearing for this application.

UNIVERSITY QUESTION PAPER

Code : 021821

B.Tech. 8th Semester Exam., 2017

Mechanical System Design

Time : 3 hours *Full Marks : 70*

Instructions :

(i) The marks are indicated in the right-hand margin.

*(ii) There are **NINE** questions in this paper.*

*(iii) Attempt **FIVE** questions in all.*

(iv) Questions No. 1 is compulsory.

(v) Standard Design Data book is allowed. Assume any missing data suitably.

1. Fill in the blanks/select correct answer for any seven of the following: 14

(i) The skirt of piston

(a) is used to withstand the pressure of gas in the cylinder

(b) acts as a bearing for the side thrust of the connecting rod

(c) is used to seal the cylinder in order to prevent leakage of the gas past the piston

(d) none of above

P.T.O.

(ii) In designing a connecting rod, it is considered like .....for buckling about X-axis.

(a) both ends fixed

(b) both ends hinged

(c) one end fixed and the other end hinged

(d) one end fixed and the other end free

(iii) Due to the centrifugal force acting on the rim, the flywheel arms will be subjected to

(a) tensile stress

(b) compressive stress

(c) shear stress

(d) none of these

(iv) When the length of the journal is equal to the diameter of the journal, then the bearing is said to be a

(a) short bearing

(b) long bearing

(c) medium bearing

(d) square bearing

(v) A bearing is designated by the number 405. It means that a bearing is of

(a) light series with bore of 5 mm

(b) medium series with bore of 15 mm

:

(c) heavy series with bore of 25 mm
(d) light series with width of 20 mm

(vi) In helical gears, the distance between similar faces of adjacent teeth along a helix on the pitch cylinders normal to the teeth, is called
(a) normal pitch
(b) axial pitch
(c) diametral pitch
(d) module

(vii) Lewis equation in spur gears is used to find the
(a) tensile stress in bending
(b) shear stress
(c) compressive stress in bending
(d) fatigue stress

(viii) In order to have smooth operation in chain drive, the minimum number of teeth on the smaller sprocket, for moderate speeds, should be
(a) 15
(b) 17
(c) 21
(d) 25

(ix) Factor of safety for fatigue loading is the ratio of
(a) elastic limit to the working stress
(b) Young's modulus to the ultimate tensile strength
(c) endurance limit to the working stress
(d) elastic limit to the yield point

(x) In static loading, stress concentration is more serious in
(a) brittle materials
(b) ductile materials
(c) brittle as well as ductile materials
(d) elastic materials

2. Design a cast iron piston for a single acting four stroke engine for the following data:
Cylinder bore = 100 mm ; Stroke = 120 mm ; Maximum gas pressure = 4 N/mm² ; Indicated mean effective pressure = 0.75 N/mm²; Mechanical efficiency = 80%; Fuel consumption = 0.15 kg per brake power per hour; Higher calorific value of fuel = 42×10^3 kJ/kg ; Speed = 2000 r.p.m.
Any other data required for the design may be assumed. 14

3. Determine the dimensions of an I-section connecting rod for a Diesel engine from the following data:
Diameter of the piston = 85 mm; Mass of the reciprocating parts = 1.5 kg; Length of the connecting rod from centre to centre = 350 mm; Stroke length = 140 mm; R.P.M. = 2000; Compression ratio = 4:1 ; Maximum explosion pressure = 3 N/mm². Take a factor of safety of 5 for the design. The density of material of the rod may be taken as 7800 kg/m³ and the allowable stress in the bolts as 90 N/mm² and in cap as 95 N/mm². Use Rankine formula for which the numerator constant may be taken as 330 N/mm² and the denominator constant 1/7500. 14

4. A gear drive is required to transmit a maximum power of 22.5 kW. The velocity ratio is 1:2 and r.p.m. of the pinion is 200. The approximate centre distance between the shafts may be taken as 600 mm. The teeth has 20° stub involute profiles. The static stress for the cast iron gear material may be taken as 60 MPa and face width as 10 times the module. Find the module, face width and number of teeth on each gear. Check the design for dynamic and wear loads. 14

5. A four stroke oil engine developing 75 kW at 300 r.p.m. is to have the total fluctuation of speed limited to 5%. The work done during the power stroke is found to be 1.3 times the average work done during the whole cycle. The turning moment diagram can be approximated as a triangle during the power stroke. Maximum torque is 1.5 times the mean torque Assume that the hoop stress in the fly wheel and the bending stress in the arms should not exceed 25 MPa. Design a cast iron flywheel. 14

6. Design a roller chain to transmit power from a 20 kW motor to a reciprocating pump. The pump is to operate continuously 24 hours per day. The speed of the motor is 600 r.p.m. and that of the pump is 200 r.p.m. 14

7. A journal bearing is to be designed for a centrifugal pump for the following data:
Load on the journal = 12 kN; Diameter of the journal = 75 mm; Speed = 1440 r.p.m;
Atm. temperature of the oil = 16°C ; Operating temperature of the oil = 60°C;
Absolute viscosity of oil at 60°C = 0.023 kg/m-s.
Give a systematic design of the bearing. 14

8. A four stroke diesel engine has the following specifications:
Brake power = 7.5 kW; Speed = 1000 rpm; Indicated mean effective pressure = 0.35 N/ mm², Maximum gas pressure = 3.5 N/mm², Mechanical efficiency = 80%.

Determine : i) Bore and length of the cylinder; ii) Thickness of the cylinder head; and iii) Size of studs for the cylinder head. 14

9. The hydraulic press, having a working pressure of water as 16 N/mm^2 and exerting a force of 80 kN is required to press materials upto a maximum size of 800 mm × 800 mm and 800 mm high, the stroke length is 80 mm. Design the following parts of the press:
   (i) Ram;
   (ii) Cylinder; and
   (iii) Pillars 14

***

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LIST OF THE EXPERIMENT

S. No.	Experiment Detail
1	Design of IC Engine Cylinder
2	Design of IC Engine Piston
3	Design of Flywheel
4	Design of Spur Gear
5	Design of Ball Bearing
6	Design of Journal Bearing

RESULT OF THE STUDENTS

				Theory Component					Practical Component					
College Roll	Reg. No	University Roll No.	Name	Total Attendance	Marks of Attendance	Class Test-I/Class Test-II	End Semester Exam	Total of Col 6+7+8	Total Attendance	Marks of Attendance	Class Performance	Comprehensive Viva Voice	Total of Col 11+12+13	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
			Full Marks		5	5	20	30		5/10	5/10	10/20	20/40	
13M44	13102107101		RAHUL KUMAR		5	5	10	20		5	5	9	19	
13M52	13102107109		KUMAR CHANDRA DEV		5	5	13	23		5	5	9	19	
14M34	14102107053		JAI HIND KUMAR		5	5	13	21		5	5	9	19	
14M01	14102107054		PRANESH KUMAR SINGH		5	5	13	23		5	5	9	19	
14M02	14102107055		SHEETAL RANJAN SAH		5	5	18	28		5	5	10	20	
14M03	14102107056		ADIL FAZAL		5	5	17	27		4	5	09	18	
14M04	14102107057		PREETAM KUMAR		4	5	14	23		5	4	08	17	
14M05	14102107058		AMRITANSH ANAND		4	5	16	25		5	5	09	19	
14M07	14102107059		PRANAV KUMAR		5	5	15	25		4	5	08	17	
14M08	14102107060		NADEEM ANSARI		5	5	10	20		5	5	09	19	
14M09	14102107061		SATISH ANAND		5	5	16	26		5	5	09	19	
14M11	14102107062		SUBIR KUMAR		4	5	14	23		5	4	09	18	
14M12	14102107063		SUMIT SAURAV		5	5	16	26		5	5	09	19	
14M13	14102107064		AMIT KUMAR		5	5	10	20		4	5	09	18	
14M14	14102107065		SHARAD BHASKAR		4	5	16	25		5	5	08	18	
14M15	14102107066		GAUTAM KUNAL BHARTI		5	5	15	25		5	5	08	18	
14M16	14102107067		MANJEET KUMAR		4	5	17	26		4	4	09	17	
14M17	14102107068		RAKESH KUMAR		5	5	14	24		5	5	09	19	
14M18	14102107069		HRISHIKESH JHA		4	5	17	26		5	5	09	19	
14M19	14102107070		ROHIT KUMAR		5	5	16	26		4	5	09	18	
14M23	14102107072		GAURAV KUMAR		5	5	16	26		5	4	08	17	
14M24	14102107073		SONU KUMAR		5	5	16	26		5	5	09	19	
14M25	14102107074		TRISHANT KUMAR		5	5	17	27		5	5	09	19	

College Roll	Reg. No	University Roll No.	Name	Total Attendance	Marks of Attendance	Class Test-I/Class Test-II	End Semester Exam	Total of Col 6+7+8	Total Attendance	Marks of Attendance	Class Performance	Comprehensive Viva Voice	Total of Col 11+12+13	Remarks
14M27	14102107075		HARI KANT UPADHYAY		5	5	17	27		5	05	09	19	
14M28	14102107076		NIKHIL ARK		4	5	17	26		5	04	09	18	
14M29	14102107077		NIKHIL KUMAR		4	5	18	27		5	05	09	19	
14M30	14102107078		SUBHANSHU MISHRA		5	5	19	29		4	04	09	17	
14M31	14102107079		SHUBHAM PANDEY		5	5	14	24		5	05	09	19	
14M32	14102107080		PANKAJ KUMAR		5	5	13	23		4	05	09	18	
14M33	14102107081		SUDHANSHU SAURAV		4	5	16	25		5	05	08	18	
14M35	14102107082		PANKAJ KUMAR		5	5	16	26		4	05	08	17	
14M36	14102107083		SHUBHAM VERMA		5	5	15	25		5	05	09	19	
14M37	14102107084		PINTU KUMAR		5	5	17	27		5	05	09	19	
14M38	14102107085		SURAJ KUMAR		5	5	10	20		5	05	09	19	
14M39	14102107086		AASHNA RAJ		5	5	AB	10		5	05	09	19	
14M40	14102107087		MD IRSHAD		4	5	13	22		5	05	09	19	
14M41	14102107088		MANISH KUMAR JHA		5	5	13	23		5	04	08	17	
14M43	14102107090		RAJESH RANJAN		5	5	15	25		5	04	09	18	
14M46	14102107091		SANJEET KUMAR		5	5	17	27		5	04	08	17	
14M47	14102107092		SAURABH PANDEY		5	5	16	26		5	05	09	19	
14M48	14102107093		SANJEEV KUMAR		5	5	17	27		4	04	09	17	
14M50	14102107094		RAHUL KUMAR		5	5	16	26		4	05	09	18	
14M06	14102107095		SHIVANI RAJ		4	5	15	24		4	05	09	18	
14M10	14102107096		KIRTY RATAN		4	5	16	25		5	04	08	17	
14M20	14102107097		RAMA SHANKAR RAVI		5	5	15	25		5	05	09	19	
14M26	14102107098		MD IMBESAT ANSARI		5	5	16	26		4	05	09	18	
14M21	14102107099		MANISH KUMAR		4	5	14	23		5	05	09	19	
14M44	14102107100		ABHISHEK KUMAR		4	5	14	23		4	05	09	18	
14M45	14102107101		PARAS KUMAR DEO		5	5	15	25		5	05	09	19	
14M49	14102107102		MODASSIR SABA NAJMI		5	5	11	21		5	04	09	18	
14M52	14102107228		AYUSH PRIYAM		5	5	15	25		5	05	09	19	
14M53	14102107229		MAYANK		5	5	19	29		5	05	09	19	
14M56	14102107230		ABHIJEET		4	5	10	19		5	04	09	18	
14M57	14102107231		RAMESH KUMAR		4	5	07	16		5	05	09	19	
14M58	14102107232		SAGEER KUMAR SANU		4	5	13	22		5	05	09	19	

College Roll	Reg. No	University Roll No.	Name	Total Attendance	Marks of Attendance	Class Test-I/Class Test-II	End Semester Exam	Total of Col 6+7+8	Total Attendance	Marks of Attendance	Class Performance	Comprehensive Viva Voce	Total of Col 11+12+13	Remarks
14M59	14102107234		ASAF MOHAMMAD KHAN		5	5	16	26		5	5	9	19	
14M60	14102107235		PUNYANIDHI		5	5	16	26		5	4	9	18	
14M62	14102107236		AMISH RAJ		5	5	12	22		5	5	9	19	
14M54	14102107282		VISHAL KUMAR		5	5	09	19		4	5	9	18	
15(LE)M12	14102107290		DIPAK KUMAR PASWAN		4	5	15	24		5	5	08	18	
15(LE)M11	14102107291		ANKITA KUMARI		5	5	15	25		5	4	09	18	
15(LE)M01	14102107292		SOURAV BHARTI		4	5	11	20		5	5	08	18	
15(LE)M03	14102107293		AFROJ ALAM		5	5	15	25		4	5	09	18	
15(LE)M08	14102107295		RAJBIRENDRA RAVIDAS		5	5	14	24		5	5	08	18	
15(LE)M09	14102107296		AKHILESH KUMAR		4	5	14	23		5	5	09	19	
15(LE)M02	14102107297		VISHAL KUMAR		4	5	16	25		4	5	09	18	
15(LE)M07	14102107298		JIMMY KUMAR		5	5	16	26		5	5	09	19	
15(LE)M06	14102107300		SANDEEP KUMAR		5	5	15	25		5	5	08	18	
14M61	14103107125		RITESH KUMAR		5	5	15	25		5	5	09	19	
15(LE)M10	15102107065		RAJU RANJAN		5	5	16	26		4	5	08	17	

RESULT ANALYSIS