MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE COVERAGE SUMMARY A.Y:2019-20

II YEAR B. TECH II SEMESTER (C-SECTION)	APPLIED THERMODYNAMICS (R18A0308)

UNIT-1

S. N.	Topic as per the syllabus	Textbook & Author	Pages
1	Rankine cycle - Schematiclayout,	THERMAL ENGINEERING BY RK RAJPUT	610
2	Thermodynamic Analysis, Concept of Mean Temperature of Heat addition		611
3	Methods to improve cycle performance Regeneration& reheating		628,642
5	Classification of Boilers, Difference of Fire Tube and Water Tube Boilers		516,517
6	H.P. Boilers		519-536
7	Mountings and Accessories - Working principle		549-572

ASSIGNMENT QUESTIONS:

1.a) How boilers are classified on different accounts with examples for each category.

b) Write any six comparisons between fire tube and water tube boilers.

2.a) Explain the working of Babcock and Wilcox boiler with the help of a neat sketch.

b) Sketch and describe a lamount boiler. What are its special features?

c) Explain Lancashire boiler with neat sketch.

3.What are the functions of boiler mountings and accessories? Explain any one accessory

4.a) Mention the different operations of Rankine cycle. Draw the schematic for an ideal Rankine cycle. Draw p-v, T-s and h-s diagrams for this cycle.

b)What are the different thermodynamic variables affecting efficiency and output of Rankine cycle. Explain their influence on Rankine cycle.

5.a) Draw diagram of 'reheat cycle'& Derive an expression for efficiency and state the advantages and disadvantages of reheating

b)Sketch the process diagram of a 'regenerative cycle'. State the advantages of regenerative cycle over simple Rankine cycle.

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
- https://www.youtube.com/watch?v=lhilSmE2Ee0
- https://www.youtube.com/watch?v=lKBqTOgOQTM
- https://www.youtube.com/watch?v=uVPp8wml9iU&list=RDQMhnWiYX71uT0&index=17
- https://www.youtube.com/watch?v=kMY0zG0sFps&list=RDQMhnWiYX71uT0&index=21

- STUDY MATERIAL: https://books.google.co.in/books?id=TEjZFUcVTbgC&printsec=frontcover#v=onepage&q&f=false

- PPTs:

PPT available in digital Notes

UNIT-2

S. N.	Topic as per the syllabus	Textbook & Author	Pages
1	Steam Nozzles: Function of nozzle	THERMAL ENGINEERING BY RK RAJPUT	755-760
2	Applications and Types- Flow through nozzles- Thermodynamic analysis.		
4	Steam Condensers: Requirements of steam condensing plant		891-898
5	Classification of condensers		
6	Working principle of different types		

ASSIGNMENT QUESTIONS:

1. a)What are the differences between the jet Condensers and surface condensers?

b)Draw the schematic diagram of Evaporative condenser and Explain Briefly?

2. a) Classify steam condensers. List out the advantages of condenser in a steam power plant.

   b) Draw the schematic diagram of parallel flow jet condenser.

3. a)In a convergent-divergent nozzle, the steam enters at 15 bar and 300oC and leaves at a pressure of 2 bar. The inlet velocity to the nozzle is 150 m/s. Find the required throat and exit areas for a mass flow rate of 1 kg/s. Assume nozzle efficiency to be 90 percent and Cps = 2.4 kJ/kg.K

   b) Steam having pressure of 10.5 bar and 0.95 dryness fraction is expanded through a convergent- divergent nozzle and the pressure of steam leaving the nozzle is 0.85 bar. Find the velocity at the throat for maximum discharge condition. If the index of expansion may be assumed to be 1.135, calculate the mass flow rate of steam through the nozzle.

4. a)Starting from the fundamentals, show that the maximum discharge through the nozzle,the ratio of throat pressure to inlet pressure is given by (2/n+1) n/n-1, where n is the index for isentropic expansion through the nozzle

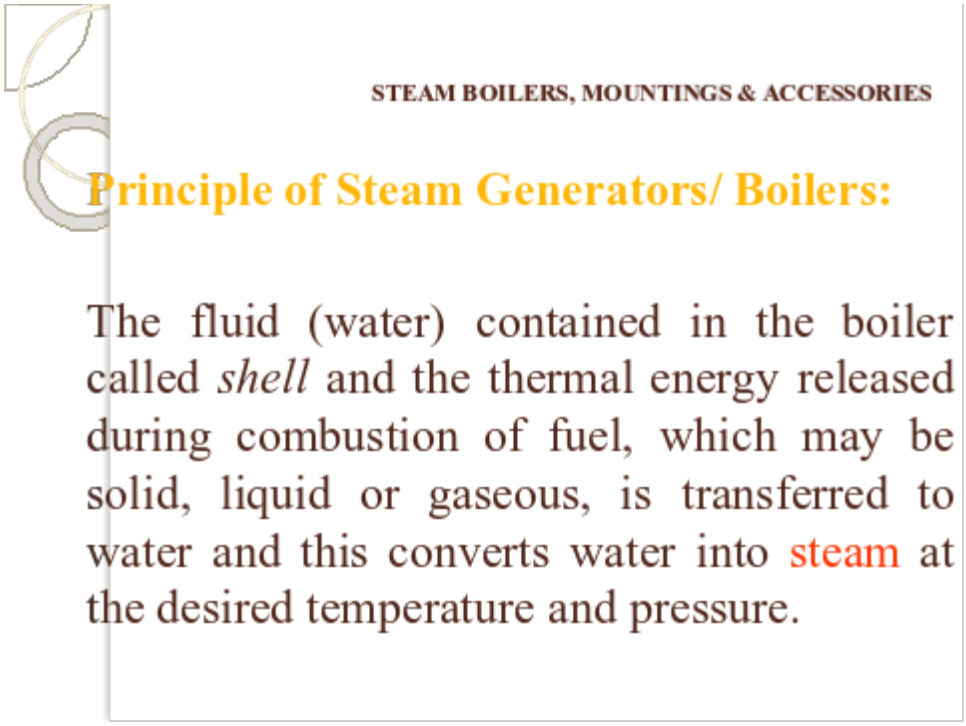
   b) Dry saturated steam enters a steam nozzle at a pressure of 15 bar and is discharged at a pressure of 2 bar. If the dryness fraction of discharge steam is 0.96, what will be the final velocity of steam? Neglect the initial velocity of the steam. If 10% of the heat drop is lost in friction, find the percentage reduction in the final velocity.

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
  https://www.youtube.com/watch?v=5Ev_hHNHTcs
  https://www.youtube.com/watch?v=vHyJnWvwKwQ&list=RDQMhnWiYX71uT0&index=15

- STUDY MATERIAL: https://books.google.co.in/books?id=TEjZFUcVTbgC&printsec=frontcover#v=onepage&q&f=false

- PPTs: PPT available in digital Notes



UNIT-3

S. N.	Topic as per the syllabus	Textbook & Author	Pages
1	Steam Turbines: Classification - Impulse turbine; Mechanical details - Velocity diagram - Effect of friction - Power developed, Axial thrust, Blade or diagram efficiency - Condition for maximum efficiency.	THERMAL ENGINEERING BY RK RAJPUT	802-810

2	Reaction Turbine: Mechanical details - Principle of operation, Thermodynamic analysis of a stage, Degree of reaction - Velocity diagram - Parson's reaction turbine - Condition for maximum efficiency.		849-859

ASSIGNMENT QUESTIONS:

1. a) What is turbine and classify them.
   b) Difference between impulse and Reaction turbine
2. Derive the expression for Maximum efficiency of reaction turbine.
3. Derive an expression for Maximum Blade Efficiency for Impulse Turbine
4. a)Explain with neat sketch of impulse turbine with Pressure and velocity curves
   b)Define the following as related to steam turbines. (i) Blade velocity coefficient

   (ii) Diagram efficiency iii) Stage efficiency iv)Blade efficiency.
5. Write a note on degree of reaction. Derive an expression for degree of reaction and show that inlet and outlet velocity triangles are symmetrical for a 50% degree of reaction turbine.
6. In a single-stage impulse turbine, the steam jet leaves the nozzles at 20º to the plane of the wheel at a speed of 670 m/s and it enters the moving blades at an angle of 35º to the drum axis. The moving blades are symmetrical in shape. Determine the blade velocity and diagram efficiency.

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
- https://www.youtube.com/watch?v=3AWQRixSe5c&list=RDQMhnWiYX71uT0&index=41
- https://www.youtube.com/watch?v=qRTT_Hr_520&list=RDQMhnWiYX71uT0&index=26

- STUDY MATERIAL: https://books.google.co.in/books?id=TEjZFUcVTbgC&printsec=frontcover#v=onepage&q&f=false

- PPTs: PPT available in digital Notes

UNIT-4

S. N.	Topic as per the syllabus	Textbook & Author	Pages
1	Gas Turbines: Simple gas turbine plant Parameters of performance	THERMAL ENGINEERING BY RK RAJPUT	1312-1328
2	Ideal cycle, essential components - Actual cycle -		
3	Regeneration, Inter cooling and Reheating -		
4	Closed and Semi - closed cycles - Merits and Demerits.		

ASSIGNMENT QUESTIONS:

1. a) Explain about the open cycle gas turbine with neat sketches and also draw P-V & T-S diagrams. Derive an expression for efficiency it?

   b) List out the advantages of open cycle gas turbine over closed cycle gas turbine.

2. a) What are the different methods to improve the efficiency of gas turbines? Explain briefly each Method with neat sketch?
3. Draw the schematic diagram of closed cycle gas turbine and explain its working.

   b) State the merits of gas turbines over IC engines.

4. Explain the operating principle of Brayton cycle with a schematic

diagram p-v and T-s diagrams.

Numerical Problems:

1. In a gas turbine plant, air is drawn at 1 bar, 150 C and the pressure ratio is 6. The expansion takes place in two turbines. The efficiency of compressor is 0.82, high pressure turbine is 0.85 and low pressure turbine is 0.84. The maximum cycle temperature is 625° C. Calculate
   i) Pressure and temperature of gases entering the low pressure turbine.
   ii) Net power developed
   iii) Work ratio
   iv) Thermal efficiency. Work output of high pressure turbine is equal to compressor work
2. In an air standard regenerative gas turbine cycle the pressure ratio is 5. Air enters the compressor at 1 bar, 300 K and leaves at 490 K. The maximum temperature in the cycle is 1000 K. Calculate the cycle efficiency, given that the efficiency of regenerator and the adiabatic efficiency of the turbine are each 80%. Assume for air, the ratio of specific heats is 1.4. Also show the cycle on T-S diagram.
3. A gas turbine unit receives air at 1 bar and 300 K and compresses it adiabatically to 6.2 bar. The compressor efficiency is 88%. The fuel has a heating value of 44186 KJ/kg and the fuel air ratio is 0.017 KJ/kg of air. The turbine efficiency is 90 %. Calculate the work of turbine and compressor per kg of air compressed and thermal efficiency. Take Cp=1.005 KJ/kg K, γ=1.4 for the compression process, Cp=1.147 KJ/kg K, γ=1.33 for the expansion process.

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS: https://www.youtube.com/watch?v=_hXXI5oUMFQ
- STUDY MATERIAL: https://books.google.co.in/books?id=TEjZFUcVTbgC&printsec=frontcover#v=onepage&q&f=false

- PPTs: PPT available in digital Notes

UNIT-5

S. N.	Topic as per the syllabus	Textbook & Author	Pages
1	Jet Propulsion: Principle of Operation - Classification of jet propulsive engines - Working Principles with schematic diagrams and representation on T-S diagram- Thrust, Thrust Power and Propulsion Efficiency - Turbo jet engines - Needs and Demands met by Turbo jet - Schematic Diagram, Thermodynamic Cycle, Performance Evaluation Thrust Augmentation - Methods.	THERMAL ENGINEERING BY RK RAJPUT	1363-1382
2	Rockets: Application - Working Principle - Classification - Propellant Type - Thrust, Propulsive Efficiency - Specific Impulse - Solid and Liquid propellant Rocket Engines	THERMAL ENGINEERING BY RK RAJPUT	1382-1385

ASSIGNMENT QUESTIONS:

1. Write the principle of jet propulsion and classify the Jet propulsive engines.
2. Explain the Ram-Jet engine and turbo prop with neat sketch.
3. Explain the working difference between propeller jet, turbo jet and turbo prop
4. Define and explain the terms:
   - Thrust
   - Thrust power,
   - Effective jet exit velocity,
   - Propulsive efficiency related to turbojet engines.
5. What are the various thrust augmentation techniques used in turbo-jet engine?
6. Explain working of turbo prop engine with a neat sketch.
7. Derive expressions for the thrust and propulsion efficiency of rockets and compare with those of turbojet
8. Differentiate between solid propellant and liquid propellant rocket engines.
9. What are composite and homogeneous solid propellants? How do they work? State their merits and demerits.
10. a)What is the essential difference between rocket propulsion and turbo-jet propulsion

    b)Write a detailed classification of rockets. Explain liquid propellant rocket with a

    neat sketch

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ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS: https://www.youtube.com/watch?v=cOk4-nKRhr8
  https://www.youtube.com/watch?v=E8VfieYhsjg&list=RDQMhnWiYX71uT0&index=47
  https://youtu.be/vw1iOhZNIzM
  https://youtu.be/FZdBIkDB1aM
  https://youtu.be/ysY3oNEBanI
  https://youtu.be/ad8t9F0Mz_o

- STUDY MATERIAL: https://books.google.co.in/books?id=TEjZFUcVTbgC&printsec=frontcover#v=onepage&q&f=false
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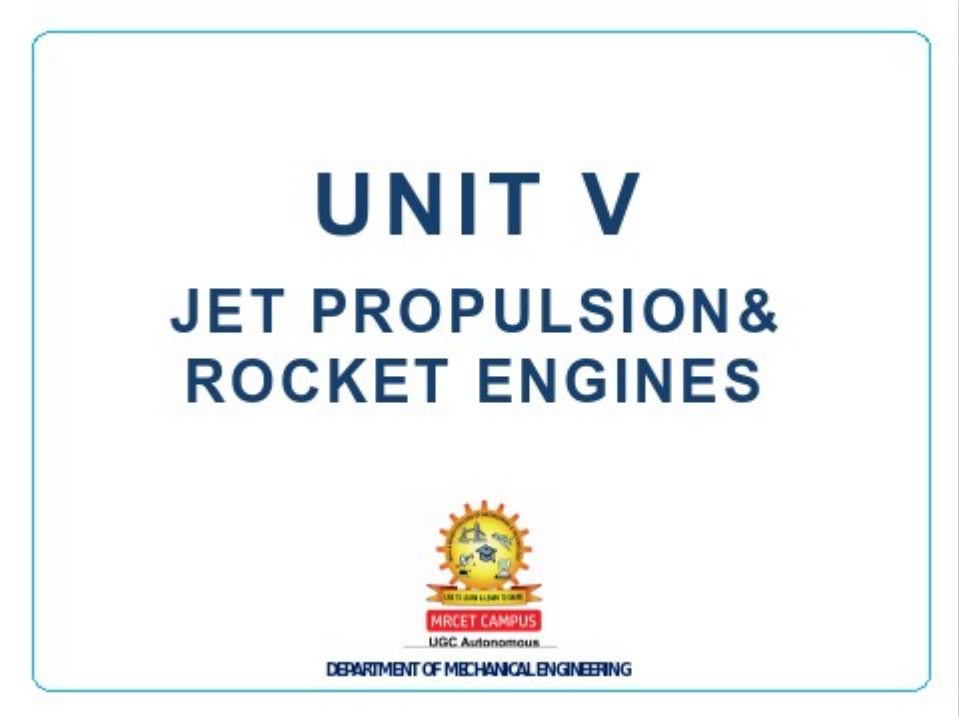

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COURSE COVERAGE SUMMARY A.Y:2019-20

II YEAR B. TECH II SEMESTER (C-SECTION)	STRENGTH OF MATERIALS (R18A0309)

Strength of Materials by R.K Bansal 4 th Edition

UNIT-1

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Simple Stresses & Strains : Elasticity and plasticity, Types of stresses & strains–Hooke's law – stress – strain diagram for mild steel	Strength of Materials by R.K Bansal	1-6
2	Concepts of Working stress – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain	Strength of Materials by R.K Bansal	6-8
3	E,G,K relations	Strength of Materials by R.K Bansal	70
4	Principle of superposition with Bars of varying section and Composite bars	Strength of Materials by R.K Bansal	30-41
5	Temperature Stresses	Strength of Materials by R.K Bansal	42-52
6	Strain energy – Resilience – Gradual, sudden, impact and shock loadings.	Strength of Materials by R.K Bansal	143-166

ASSIGNMENT QUESTIONS:

1. Determine the young's modulus and Possion's ratio of a metallic bar of length 25cm breadth 3cm depth 2cm when the beam is subjected to an axial compressive load 240KN. The decrease in length is given by 0.05cm and increase in breadth 0.002
2. A steel rod and two copper rods together support a load of 370 kN as shown in fig. The cross sectional area of steel road is 2500 mm2 and of each copper road is 1600 mm2. Find the stresses in the roads. Take E for steel is 2x105 N/mm2 and for copper is 1x105 N/mm2
3. Draw stress strain diagram for ductile materials and indicate all salient features on it. Explain the various mechanical properties can be estimated from that diagram.
4. 2. Derive the relations between E,G,K
5. 3. Derive the expression for the elongation for the circular tapered bar
6. Two parallel walls 6m apart are stayed together by a 25 mm diameter steel rod at

7. 80^0C passing through washers and nuts at ends. If the rod cools down to 22^0C,calculate the pull induced in the rod, if (a) the walls do not yield and (b) the total yield at ends is 1.5 mm
   E steel = 2×105N/mm2, α steel = 11×10^{-6} per^{0}C.
8. A metallic rod of 1 cm diameter, when tested under an axial pull of 10 kN was found to reduce its diameter by 0.0003 cm. The modulus of rigidity for therod is 51 KN/mm2. Find the Poisson's ratio, modulus of elasticity and Bulk Modulus.
9. b) An aluminium bar 60 mm diameter when subjected to an axial tensile load 100 kN elongates 0.20 mm in a gage length 300 mm and the diameter is decreasedby 0.012 mm. Calculate the modulus of elasticity and the Poisson's ratio of the material.
10. A specimen of diameter 13 mm and gauge length 50 mm was tested under tension. At 20 kN load, the extension was observed to be 0.0315 mm. Yielding occurred at a load of 35 kN and the ultimate load was 60 KN. The final gauge length at fracture was 70 mm. Calculate young's modulus, yield stress, ultimate strength and percentage elongation.

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
- https://www.youtube.com/watch?v=wLrfNkRTYjc
- https://www.youtube.com/watch?v=nOaqNv1K50g
- https://www.youtube.com/watch?v=KBoP_6BxoLc
- https://www.youtube.com/watch?v=sZi0W3pr8Jg
- https://www.youtube.com/watch?v=gvVhTKLgFQI

- STUDY MATERIAL: Available in digital Note and will send the books in what's up group

- PPTs: PPT available in digital Notes

UNIT-2

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Shear Force and Bending Moment Diagrams: Definition of beam – Types of beams – Concept of shear force and bending moment	Strength of Materials by R.K Bansal	235-238
2	S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l., uniformly varying loads and combination of these loads – Point of contra flexure.	Strength of Materials by R.K Bansal	238-279

ASSIGNMENT QUESTIONS:

1. A cantilever beam of 2 m long carries a uniformly distributed load of 1.5kN/m over a length of 1.6 m from the free end. Draw shear force and bending moment diagrams for the beam
2. A simply supported beam 6 m long is carrying a uniformly distributed load of 5kN/m over a length of 3 m from the right end. Draw shear force and bending moment diagrams for the beam and also calculate the maximum bending moment on the beam
3. A simply supported beam of 16m long carries the point loads of 4KN, 5KN and 3KNat distances 3m, 7m and 10m respectively from the left support. Calculate the maximum shear force Draw SFD & BMD
4. A horizontal beam of 10m long is carrying a uniformly distributed load of 1kN/m. The beam is supported on two supports 6m apart. Find the position of supports, so that bending moment on the beam is small as possible. Also draw the SFD & BMD for the beam
5. A beam of length l carries a uniformly distributed load of w per unit length. The beam is supported on two supports at equal distances from the two ends. Determine the position of the supports, if the B.M, to which the beam is subjected to , is as small as possible. Draw the SFD & BMD for the beam.
6. A simply supported beam of length 10m, carries the uniformly distributed load and two point loads as shown in Fig.(2) Draw the S.F and B.M diagram for the beam and also calculate the Maximum bending moment

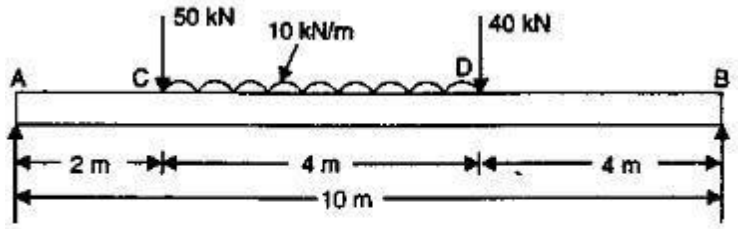
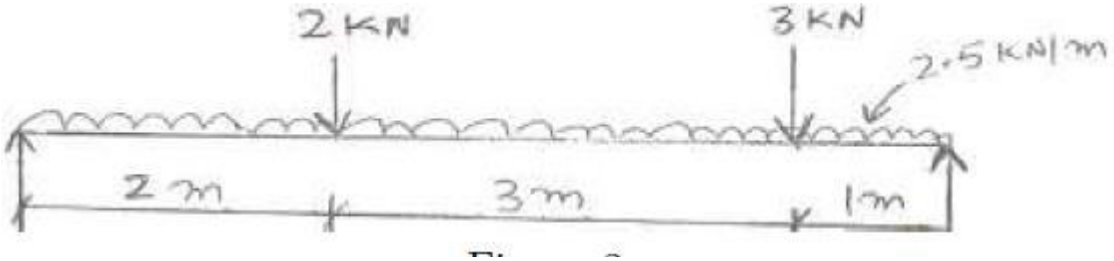


Fig.(2)

7. A cantilever of length 2.0 m carries a uniformly distributed load of 1 kN/m run over a length of 1.5 m from the free end. Draw the shear force and bending moment diagrams for the cantilever.
8. An overhanging beam ABC of length 7 m is simply supported at A and B over a span of 5 m and portion BC overhangs by 2 m. Draw the shearing force and bending moment diagrams abd determine the point of contra-flexure if it is subjected to uniformly distributed loads of 3 KN/m over the portion AB and a concentrated load of 8 kN at C.
9. A beam of span 10m is simply supported at two points 6m apart with equal over-hang on either side.
10. Both the overhanging portions are loaded with a uniformly distributed load of 2 kN/m run and the beam also carries a concentrated load of 10 N at the midspan. Construct the SF and BM diagrams and locate the points of inflexion, if any.

11. Sketch the shear force and bending moment diagrams showing the salient values for the loaded beam shown in the figure below.



12. A Simply supported beam of span,9 m hL of 15 KN/m over 4 m from the left support and a concentrated load of 20KN at the center. Draw SF and BM diagrams

13. A Beam of length 12m is supported at left end and the other support is at a distance of 8m from the left support leaving a overhanging length of 4m on the right side.It carries a UDL of 10 KN/m over the entire length and a concentrated load of 8 KN at the right extreme end. Draw the shear force and bending moment diagrams and find the position of Contra flexure point

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
  https://www.youtube.com/watch?v=LWuEdZPGbI4&list=PL4K9r9dYCOopLQIqfKO5haEkR1FKKVJdU&index=2
  https://www.youtube.com/watch?v=7WD3fCnA2jY&list=PL4K9r9dYCOopLQIqfKO5haEkR1FKKVJdU&index=3
  https://www.youtube.com/watch?v=frH1mN8K3mQ&list=PL4K9r9dYCOopLQIqfKO5haEkR1FKKVJdU&index=4
  https://www.youtube.com/watch?v=l5YZu1DdFu8&list=PL4K9r9dYCOopLQIqfKO5haEkR1FKKVJdU&index=5
  https://www.youtube.com/watch?v=sgEEHLp3lJo&list=PL4K9r9dYCOopLQIqfKO5haEkR1FKKVJdU&index=6
  https://www.youtube.com/watch?v=UahfUvcS24o
  https://www.youtube.com/watch?v=ouuRroDon0A

- STUDY MATERIAL: Available in digital Note and will send the books in what's up group

- PPTs: PPT available in digital Notes

UNIT-3

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R Neutral axis	Strength of Materials by R.K Bansal	292-297
2	Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I, T, sections & Problems	Strength of Materials by R.K Bansal	300-320
3	Shear Stresses: Derivation of formula	Strength of Materials by R.K Bansal	342-345
4	Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T sections Problems	Strength of Materials by R.K Bansal	345-386

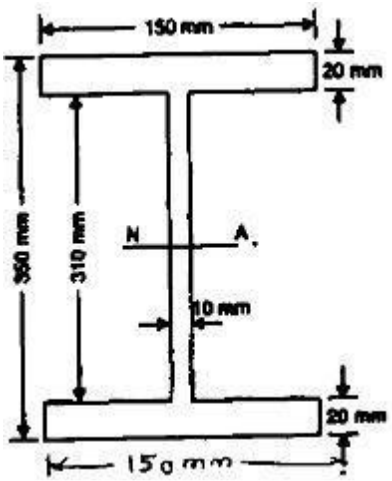
ASSIGNMENT QUESTIONS:

1. Derive the equation of bending moment and write down the assumptions for theory of simple bending.

2. A simply supported beam carries a U.D.L. of intensity 2.5 kN/metre over entire span of 5 meters. The cross-section of the beam is a T-section having the dimensions
   Top ange: 125 mm cm X 25 mm
   Web: 175 mm cm X25 mm

   Calculate the maximum shear stress for the section of the beam.

3. A cantilever beam of length 10 m has a cross section of 100 mm X 130 mm has a UDL of 10 KN/m over a length of 8 m from the left support and a concentrated load of 10 KN at the right end. Find the bending stress in the beam
4. 4. A beam of T - section is having flange 120mm × 15mm and web 100mm × 15mm. It is subjected to a shear force of 24kN. Draw shear stress distribution across the depth marking values at salient points.
5. 5. An I section is having overall depth as 550mm and overall width as 200mm. The thickness of the flanges is 25mm where as the thickness of the web is 20mm. If the section carries a shear force of 45kN, calculate the shear stress values at salient points and draw the sketch showing variation of shear stress.
6. A rectangular beam 300 mm deep is simply supported over a span of 4m. Determine the uniformly distributed load per meter which the beam may carry, if the bending stress should not exceed 120 N/mm2.



7. A rolled steel joist 200mmx160mm wide has flange 22mm thick and web 12mm thick. Find the proportion, in which the flanges and web resist shear force.
8. 5. A simply supported beam of 2m span carries a U.D.L. of 140 kN/m over the whole span. The cross section of the beam is T-section with a flange width of 120mm, web and flange thickness of 20mm and overall depth of 160mm. Determine the maximum shear stress in the beam and draw the shear stress distribution for the section.
9. 6. A simply supported symmetric I-section has flanges of size 200 mmX 15 mm and its overall depth is 520 mm. Thickness of web is 10mm. It is strengthened with a plate of size 250 mm X 12mm on compression side. Find the moment of resistance of the section if permissible stress is 160 M Pa. How much uniformly distributed load it can carry if it is used as a cantilever of span 3.6m.

10. An I-section beam 350mmX200mm has a web thickness of 12.5mm and a flange thickness of 25mm. It carries a shearing force of 200kN at a section. Sketch the shear stress distribution across the section.

ADDITIONAL RESOURSES:

NPTL VIDEO LINKS:

https://www.youtube.com/watch?v=K9nl606I0W0
https://www.youtube.com/watch?v=YribqtPZm5c
https://www.youtube.com/watch?v=dVCDaCrwJrs

- STUDY MATERIAL: Available in digital Note and will send the books in what's up group
- PPTs: PPT available in digital Notes

UNIT-4

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Deflection of Beams: Bending into a circular arc – slope, deflection and radius of curvature	Strength of Materials by R.K Bansal	511-515
2	Differential equation for the elastic line of a beam – Double integration ,point load,U.D.L uniformly varying load. (cantilever and simply supported)	Strength of Materials by R.K Bansal	515-531 554-570
3	Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point load, U.D.L uniformly varying load.	Strength of Materials by R.K Bansal	531-546

ASSIGNMENT QUESTIONS:

1. A cantilever 3m long has moment of inertia 800 Cm4 for 1m length from the free end, 1600 cm4 for the next 1m length 2400 Cm4 for the last 1m. length. At the free end a load of 1 KN acts on the cantilever. Determine the slope and deflections at the free end of the cantilever E= 210 GN/ m2
2. A simply supported beam of span 6m carries two point loads of 60KN and 50KN at 1m and 3m respectively from the left end. Find the position and magnitude of max. deflection. Take E= as 200 GPa and I =8500cm4. Also determine the value of deflection at the same point if one more load of 60KN is placed over the left support.
3. A beam AB of 8 m span is simply supported at the ends. It carries a point load of 10 kN at a distance of 1 m from the end A and a uniformly distributed load of 5 N/m for a length of 2 m from the end B. If I = 10 _ 106 m4, Using Macaulay`s Method, Determine:
   (a) Deection at the mid-span,
   (b) Maximum deection, and
   (c) Slope at the end A

.4. A simply supported beam of 8m carries a partial u d l of intensity 5KN/m and length 2m, sarting from 2m from the left end. Find slope at left support and central deflection. Take E= 200Gpa and I=8×108mm4

5. A simply supported beam of 8m carries a partial u d l of intensity 5KN/m and length 2m, sarting from 2m from the left end. Find slope at left support and central deflection. Take E= 200Gpa and I=8×108mm4
6. 2. A simply supported beam span 14m, carrying concentrated loads of 12KN and 8KN at two points 3mts and 4.5m from the two ends respectively. Moment of Inertia I for the beam is 160 x103 mm4 and E = 210KN/mm2. Calculate deflection of the beam at points under the two loads by macaulay's method

7. 3. A Cantilever beam AB 6 mts long is subjected to u.d.l of w KN/m spread over the entire length. Assume rectangular cross-section with depth equal to twice the breadth. Determine the minimum dimension of the beam so that the vertical deflection at free end does not exceed 1.5 cm and the maximum stress due to bending does not exceed 10 KN/cm2. E = 2 X 107 N/ cm2.

8. A simply supported beam of span 6m carries two point loads of 60KN and 50KN at 1m and 3m respectively from the left end. Find the position and magnitude of max. deflection. Take E= as 200 GPa and I =8500cm4. Also determine the value of deflection at the same point if one more load of 60KN is placed over the left support

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
- https://www.youtube.com/watch?v=HSMsxihUd4M
- https://www.youtube.com/watch?v=Lg9ZfwUP2GE
- https://www.youtube.com/watch?v=63-yOAyEGHw
- https://www.youtube.com/watch?v=jrYwAvUj5DM
- https://www.youtube.com/watch?v=YqxJlNZBILA

- STUDY MATERIAL: : Available in digital Note and will send the books in what's up group

- PPTs: PPT available in digital Notes

UNIT-5

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Torsion of Circular Shafts: Theory of pure torsion, Derivation of torsion equations: T/J=q/r=Nθ/L-Assumptions made in theory of pure torsion-Torsional moment of resistance – Polar section modulus – Power transmitted by shafts.	Strength of Materials by R.K Bansal	672-677
2	Problems	Strength of Materials by R.K Bansal	678-720
3	Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in dia, and volume of thin cylinders.	Strength of Materials by R.K Bansal	740-761

ASSIGNMENT QUESTIONS:

1. Derive an expression for the shear stress produced in a circular shaft which is

subjected to torsion. What are the assumptions made in the above derivation

2. 2. a)Derive the formula for the hoop stress in a thin cylindrical shell subjected to an internal pressure.
   b) A gas cylinder of thickness 25 mm and has an internal diameter of 1500 mm.
   The tensile stress in the gas cylinder material is not to exceed 100 N/mm2. Calculate the allowable internal pressure of the gas inside the cylinder.
3. 3. A thin cylindrical shell is 3m long and 1m in internal diameter. It is subjected to internal pressure of 1.2 MPa. If the thickness of the sheet is 12mm, find the circumferential stress, longitudinal stress, changes in diameter, length and volume. Take E=200 GPa and μ= 0.3.
4. 4. A Hollow shaft is to transmit 400 KW power at 120 rpm. If the shear stress is not exceed 60 N/mm2 and internal diameter is 0.65 of external diameter. Find the internal and external diameters assuming maximum torque is 1.5 times the mean
5. 5. A hollow shaft of diameter ratio 3/8 is to transmit 395 kW at 120 rpm. The maximum torque being 24% greater than the mean, the shear stress is not to exceed 65 MPa and the twist in a length of 6 m is not to exceed 3 degrees. Calculate its external and internal diameters which would satisfy both the above said conditions. Take G=9.2×104 MPa.
6. A cylindrical vessel 2m long and 500mm in diameter with 10mm thick plates is subjected to an internal pressure of 3MPa.Calculate the change in volume of the vessel .Take E=200GPa and poissons ratio=0.3 for the vessel material.
7. A shaft is to be transmitted 100KW at 240 rpm. If the allowable shear stresses of the material is 60MPa. The shaft is not to twist more than 10 in a length of 3.5 mts. Find the diameter of the shaft based on strength and stiffness criteria. The modulus of rigidity of the material (N) is 80 X 103N/mm2.
8. A cylindrical vessel 3m long and 500mm in diameter with 10mm thick plates is subjected to an internal pressure of 3MPa.Calculate the change in volume of the vessel .Take E=210GPa and Poisson's ratio=0.3 for the vessel material
9. A thin cylindrical shell is 3m long and 1m in internal diameter. It is subjected to internal pressure of 1.2 MPa. If the thickness of the sheet is 12mm, find the circumferential stress, longitudinal stress, changes in diameter, length and volume. Take E=200 GPa and μ= 0.3.
10. A thin cylindrical shell is 3m long and 1m in internal diameter. It is subjected to internal pressure of 1.2 MPa. If the thickness of the sheet is 12mm, find the circumferential stress, longitudinal stress, changes in diameter, length and volume. Take E=200 GPa and μ= 0.3.
11. A hallow shaft of outside diameter 80 mm and inside diameter 50 mm is made of aluminium having shear modulus G = 27GPa. When the shaft is subjected to a torque T = 4.8 kN-m, what is the maximum shear strain and maximum normal strain in the bar?

ADDITIONAL RESOURSES:

NPTL VIDEO LINKS:

https://www.youtube.com/watch?v=8nB9OlTG6Vg
https://www.youtube.com/watch?v=-mjCtqkFoBI
https://www.youtube.com/watch?v=nyzNzSJaIdo
https://www.youtube.com/watch?v=UXPEirQ736U

- STUDY MATERIAL: : Available in digital Note and will send the books in what's up group

- PPTs: PPT available in digital Notes

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE COVERAGE SUMMARY A.Y:2019-20	
II YEAR B. TECH II SEMESTER (C-SECTION)	**DYNAMICS OF MACHINEREY (R18A0307)**

UNIT-1

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1.	Gyroscopes	Khurmi, R. et al.; Theory of Machines, 14th ed.; S. Chand & Co. Ltd	480
2.	Precessional Angular Motion		481
3.	Gyroscopic Couple		483
4.	Effect of the Gyroscopic Couple on an Aeroplane		486
5.	Effect of Gyroscopic Couple on a Naval Ship during Steering		488
6.	Stability of a Four Wheel Drive Moving in a Curved Path		495
7.	Stability of a Two Wheel Vehicle Taking a Turn		504

ASSIGNMENT QUESTIONS:

1] a. What is the gyroscopic effect on a ship when it turns towards left and the propeller rotates Counter clockwise when viewed from stern.

b. The mass of turbine rotor of a ship is 8 tonnes and has a radius of gyration of 0.6 meters. It rotates at 1800 rpm clockwise when looking from the front. Determine the gyroscopic effect if,

i) The ship is travelling at 100 km/h and steers to the right in a curve of 70 meters radius.

ii) The ship is pitching and the bow descends with maximum velocity. The pitching is simple harmonic and the total angular movement between the extreme positions is 10 degrees.

iii) The ship is rolling and at a certain instant has an angular velocity of 0.03 radians/ second clockwise when looking from bow.

2] a. What is the effect of gyroscopic couple on the stability of a two-wheeler taking a turn?

b. The mass of the motorcycle along with the rider is 180 kg. The height of the centre of gravity of total mass is 600mm above the ground when it moves straight. Each wheel has a diameter of 700mm and mass moment of inertia of 2 kgm^2.The engine rotates at a speed of 5 times the road wheel and engine rotating parts have mass moment of inertia of 0.2kgm2. Determine the angle of heel required if the motorcycle negotiates a curve of radius 100 meters at a speed of 108 km/hr.

3] a. Explain the gyroscopic effect on an aero plane.

b. A racing car weighs 20 kN. It has a wheelbase of 2m, track width of 1m and height of C.G 300 mm above ground level and lies midway between the front and rear axles. The engine flywheel rotates at 3000 rpm clockwise when viewed from the front. The moment of inertia of the flywheel is 4kgm^2 and the moment of inertia of each wheel is 3kgm^2 Find the reactions between the wheels and the ground when the car takes a curve of 15m towards right at 30 km/hr, taking into consideration the gyroscopic and centrifugal effects. Each wheel radius is 400mm.

4] a. An aero-plane makes a complete half circle of 50 m radius towards left in a time of 20

seconds when flying at 200kmph. The rotary engine and the propeller of the plane has a mass of 400kg and a radius of gyration of 0.3 m. The engine rotor rotates at 2400 rpm clockwise when seen from the rear. Find the gyroscopic couple on the aircraft and state its effect on the aero-plane.

b. Define precession axis and spin axis by neat sketches.

5] a. Derive the equation for Gyroscopic couple for a rotating disc.

b. A uniform disc having a mass of 8 kg and radius of gyration 150 mm is mounted on one end of a horizontal arm of length 200 mm. The other end rotates freely in a bearing. The disc is given a clockwise spin of 240 rpm. Determine the motion of the disc if its arm remains horizontal.

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
  https://www.youtube.com/watch?v=FydJu1A1oeM
  https://nptel.ac.in/courses/112104114/
- STUDY MATERIAL:
  https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/112103025/lec11.pdf
  https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/112103025/lec13.pdf
  https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/112103108/lec35.pdf
  https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/112103025/lec10.pdf
- PPTs:

Attached as annexure

UNIT-2

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1.	Static Force Analysis of Planar Mechanisms	S S Ratan, Theory of Machines, 4th ed; McGrew Hill Education	356
2.	Dynamic Force Analysis of Planar Mechanisms		368
3.	Inertia forces and D'Alembert's Principle – planar rotation about a fixed centre		396
4.	Friction in Machine Elements	Khurmi, R. et al.; Theory of Machines, 14th ed.; S. Chand & Co. Ltd	259
5.	Friction of screw and nuts		270
6.	Pivot and collars-uniform pressure, uniform wear		286-297
7.	Friction circle and friction axis: lubricated surfaces-boundary friction-film lubrication		285

ASSIGNMENT QUESTIONS:

1. a) Distinguish between static and dynamic friction with suitable examples.

b) An effort of 3000N is required to just move a certain body up an inclined plane of angle 120, force acting parallel to the plane. If the angle of inclination is increased to 150, and then the effort required is 3500 N. Find the weight of the body and the coefficient of friction.

2. a) Derive expression for the mean torque transmitted for a body moving down an inclined plane.

b) The mean diameter of a screw jack having pitch of 10 mm is 50 mm. A load of 20 kN is lifted through a distance of 170 mm. Find the work done in lifting the load and efficiency of the screw jack when

(i) The load rotates with the screw and load rests on loose end which does not rotate with the screw.

3. a) What is a clutch? Describe a single plate clutch with a neat diagram.

b) Determine the axial force required to engage a cone clutch transmitting 20kW of power at 750 rpm. Average friction diameter of the cone is 400mm and average pressure Intensity 60 kN/m2. Semi cone angle is 100 and coefficient of friction is 0.25. Also find the width of the friction cone.

4. a) A single plate clutch having both sides effective is required to transmit 45 kW at 1500 rpm. The outer diameter of the plate is limited to 300 mm and the intensity of pressure between the plates is not to exceed 0.07 MPa. Assuming uniform wear and a coefficient of friction 0.35,

b) Determine the inside diameter of the plate? Explain about boundary friction and film lubrication?

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
  https://www.youtube.com/watch?v=fEdz91oWrts&list=PL46AAEDA6ABAFCA78&index=3
  https://www.youtube.com/watch?v=oVaEe-L4QGA
  https://www.youtube.com/watch?v=YhduErWjg-M
- STUDY MATERIAL:
  https://nptel.ac.in/courses/112101096/
  https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/115104094/lec28.pdf
  https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/112103108/lec11.pdf
- PPTs:

Attached as annexure

UNIT-3

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1.	Friction clutches- Single Disc or plate clutch, Multiple Disc Clutch, Cone Clutch, Centrifugal Clutch	Khurmi, R. et al.; Theory of Machines, 14th ed.; S. Chand & Co. Ltd	297-320
2.	Simple block brakes, internal expanding brake, band brake of vehicle		732-762
3.	Dynamometers – absorption and transmission types. General description and methods of operations		762-770
4.	Turning moment – Inertia Torque connecting rod angular velocity and acceleration, crank effort and torque diagrams – Fluctuation of energy – Fly wheels and their design		565-611

ASSIGNMENT QUESTIONS:

1. The turning moment diagram for a four stroke gas engine may be assumed for simplicity to be represented by four triangles, the areas of which from the line of zero pressure are as follows: Expansion stroke = 3550 mm^2 ; Exhaust stroke = 500 mm^2 ; Suction stroke = 350 mm^2 ; and compression stroke = 1400 mm^2 . each mm2 represents 3 N-m. Assuming the resisting moment to be uniform, find the mass of the rim of a fly wheel required to keep the mean speed 200 rpm within ±2%. The mean radius of the rim may be taken as 0.75 m. Also determine the crank positions for the maximum and minimum speeds.
2. A steam engine runs at 150 rpm. Its turning moment diagram gave the following area measurements in mm2 taken in order above and below the mean torque line: 500, -250, 270, -390, 190, -340, 270, -250. The scale for the turning moment is 1 mm = 500 N-m, and for crank angle is 1 mm = 5^o . If the fluctuation of speed is not to exceed ± 1.5 % of the mean, determine a suitable diameter and cross-section of the rim of the flywheel assumed with axial dimension (i.e., width of the rim) equal to 1.5 times the radial dimension (i.e., thickness of the rim). The hoop stress is limited to 3 Mpa and the density of the material of the flywheel is 7500 kg/m3.
3. a. What is meant by self locking and a self energized brake?
   b. A band brake acts on 3/4 th of a circumference of a brake drum of 450 mm diameter which is keyed to a shaft. The band brake provides a braking torque of 225 Nm. One end of the lever is attached to a fulcrum pin of the lever and the other end is attached to a pin 100 mm from the fulcrum. If the operating force is applied at 500 mm from the fulcrum and coefficient of friction is 0.25, find the operating force when the drum rotates in i) Clock-wise direction, ii) anti- clockwise direction.
4. Explain the types of absorption dynamometer and transmission dynamometer with neat sketch.

5. The turning moment diagram for a multi cylinder engine has been drawn to a scale of 1mm to 500 Nm of torque and 1mm to 6^0 of crank displacement. The intercepted areas between the output torque curve and the mean resistance line taken in order from one end of the engine are -30, +410, -280, +320, -330, +250, -360, +280, -260 mm^2 when the engine runs at 800 rpm. The engine has a stroke of 300 mm and the fluctuation of speed is not to exceed 2% of mean speed. Determine suitable diameter and cross section of the flywheel rim for a limiting value of safe centrifugal stress of 7 Mega Pascal. The material density is 720kg / m^3. Width of the rim is 5 times the thickness.

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
  https://www.youtube.com/watch?v=WCXgFmgbLvA
  https://www.youtube.com/watch?v=vosEgTUUxj8
  https://www.youtube.com/watch?v=ZldkigrDplc
  https://www.youtube.com/watch?v=swgvKwyOnYk
- STUDY MATERIAL:
  https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/112103108/lec11.pdf
  https://nptel.ac.in/content/storage2/courses/116102012/download/faqm9.pdf

https://www.yumpu.com/en/document/read/10225091/clutch-nptel-indian-institute-of-technology-madras
https://nptel.ac.in/content/storage2/courses/112101096/download/lecture-8.pdf

- PPTs:

  Attached as annexure

UNIT-4

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1.	Balancing of rotating masses Single and multiple – single and different planes. Balancing of Reciprocating Masses- Primary, Secondary, and higher balancing of reciprocating masses. Analytical and graphical methods	Khurmi, R. et al.; Theory of Machines, 14th ed.; S. Chand & Co. Ltd	833-857
2.	Unbalanced forces and couples- examination of 'V' multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing		858-908
3.	Free Vibration of mass attached to vertical spring – Simple problems on forced damped vibration		909-971
4.	Vibration Isolation & Transmissibility Whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems		972-1001

ASSIGNMENT QUESTIONS:

1. A shaft is rotating at a uniform angular speed. Four masses M1, M2, and M3and M4 of magnitudes 300kg, 450kg, 360kg, 390kg respectively are attached rigidly to the shaft. The masses are rotating in the same plane. The corresponding radii of rotation are 200mm, 150mm, 250mm and 300mm respectively. The angle made by these masses with horizontal are 0°.45°, 120°and 255°respectively. Find, (i) the magnitude of balancing mass (ii) the position of balancing mass if its radius of rotation is 200mm.
2. Four masses M1, M2, M3, and M4 are 200kg, 300kg, 240kg and 260kg respectively. The corresponding radii of rotation are 0.2m, 0.15m, 0.25m and 0.3m respectively and the angle between successive masses45°, 75°, and135°.Find the position and magnitude of balance mass required if its radius of rotation is 0.25m.
3. A, B, C and D are four masses carried by a rotating shaft at radii 100mm,125mm,200mm and 150mm respectively. The planes in which the masses revolve are spaced 600mm apart and the masses of B,C and D are 10kg,5kg and 4kgrespectively.Find the required mass A and relative angular setting of the four masses so that the shaft be in complete balance.
4. A shaft caries four rotating masses A, B, C and D which are completely balanced. The masses B, C and Dare 50kg, 80kg and 70kg respectively. The masses C and D make angles of 90° and 195° respectively with mass B in the same sense. The masses A,B,C and D are concentrated at radius 75mm,100mm,50mm and 90mmrespectively.The plane of rotation of masses B and C are 250mm apart. Determine (i) the magnitude of mass A and its angular position (ii) the position of planes A and D.

5. Four masses A, B, C, and D are completely balanced masses C and D makes angles of 90° and 195° respectively with B in the same sense. The rotating masses have the following properties:

   mA=25kg rA=150mm
   mB=40kg rB=200mm
   mC=35kg rC=100mm rD=180mm
   Planes B and C are 250mm apart. Determine (i) the mass A and its angular position (ii) the position of planes A and D.

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
  https://nptel.ac.in/courses/112104114/
  https://youtu.be/aRulDXMuNDc
  https://youtu.be/HKVvJWArgg8
  https://youtu.be/CI9xMNvTLFI
  https://youtu.be/jUE8cJDyJvU
  https://youtu.be/DkqS6e72d-Y
  https://youtu.be/DTUE-kQGDhw
  https://youtu.be/GPDZ4izcS2M

- STUDY MATERIAL:
  https://nptel.ac.in/content/storage2/courses/112101096/download/lecture-5.pdf
  https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/112107212/lec40.pdf
- PPTs:
  Attached as annexure

UNIT-5

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1.	Watt, Porter and Proell governors. Spring loaded governors – Hartnell and hartung with auxili ary springs	Khurmi, R. et al.; Theory of Machines, 14th ed.; S. Chand & Co. Ltd	653-694
2.	Sensitiveness, isochronism and hunting		700-702

ASSIGNMENT QUESTIONS:

1. A porter governor has equal arms each 250mm long and pivoted on the axis of rotation. Each ball has a mass of 5kg and mass of the central load on the sleeve is 25kg.The radius of rotation of the ball is 150mm when governor is at maximum speed. Find the maximum and minimum speed and range of speed of the governor.

2. The length of the upper and lower arms of a porter governor are 200mm and 250mm respectively. Both the arms are pivoted on the axis of rotation. The central load is 150N, the

weight of the each ball is 20N and the friction of the sleeve together with the resistance of the operating gear is equivalent to a force of 30N at the sleeve. If the limiting inclinations of the upper arms to the vertical are 30° and 40° taking friction into account. Find the range of speed of the governor.

3. A hartnell governor having a central sleeve spring and two right angled bell crank lever operates between 290rpm and 310rpm for a sleeve lift of 15mm.The www.padeepz.net www.padeepz.net sleeve and ball arms are 80mm and 120mm repectively. The levers are pivoted at 120mm from the governor axis and mass of the ball is 2.5kg.The ball arms are parallel at lowest equilibrium speed. Determine (i) load on the spring at maximum and minimum speeds and (ii) Stiffness of the spring.
4. Calculate the minimum speed of a proell governor, which has equal arms each of 200mm and are provided on the axis of rotation. The mass of each ball is 4kg and the central mass on the sleeve is 20kg.The extension arms of the lower links are each 60mm long and parallel to the axis when the minimum radius of the ball is 100mm.of load.
5. In a spring controlled governor, the controlling force curve is a straight line. When the balls are 400mm apart, the controlling force is 1200N and when 200mm apart, the controlling force is 450N.Determine the speed at which the governor runs when the balls are 250mm apart. When initial tension on the spring would be required for isochronisms and what would be the speed. Take mass of each ball to be 10kg

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
  https://youtu.be/OlZXxPVpmBs
  https://youtu.be/AchBiFAEeLo
  https://youtu.be/dXsQslmyxf4

- STUDY MATERIAL:
  https://nptel.ac.in/content/storage2/courses/108101040/download/lec-15.pdf
  https://d13mk4zmvuctmz.cloudfront.net/assets/main/studymaterial/notes/mechanical_engineering_dynamics-of-machines_governors_notes.pdf
- PPTs:
  Attached as annexure

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(Autonomous Institution – UGC, Govt. of India)

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE COVERAGE SUMMARY A.Y:2019-20

II YEAR B. TECH II SEMESTER (C-SECTION)	DATA STRUCTURES USING PYTHON

UNIT-1

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Python Introduction and features	Core Python Programming By Wesley J Chun	06
2	Python Installation and working		11
3	Python variables		64
4	Python Operators		96
5	Python Data Types		91
6	Python Strings		158

ASSIGNMENT QUESTIONS:

1. Explain the features of Python Programming?
2. Explain python operators with example programs?
3. Explain python data types with example programs in details?
4. Define string? Explain string operations in python with example programs?
5. Explain python installation and working in detail?

ADDITIONAL RESOURCES:

Video Links:

https://www.youtube.com/watch?v=QXeEoD0pB3E&list=PLsyeobzWxl7poL9JTVyndKe62ieoN-MZ3

https://www.youtube.com/watch?v=OV9WlTd9a2U

https://www.youtube.com/watch?v=mpnBNGOSplA&list=PLS1QulWo1RIYt4e0WnBp-ZjCNq8X0FX0J

Study Material:

https://drive.google.com/file/d/1l38Xs34VsekhDmBE80E8Jk81o6xlrre1/view?usp=sharing

https://drive.google.com/file/d/1iGATd9qBSY4JcQKYl28yk05m8viSMBY0/view?usp=sharing

PPT Link:

https://drive.google.com/file/d/1utQigtkR7U36Y2z65p3CyIeqzq-8m9tO/view?usp=sharing

UNIT-2

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Control flow: if, if-else, elif, nested if	Core Python Programming By Wesley J Chun	291
2	Loops statements: while , for		296
3	Range function		299
4	Loop manipulation using break, continue, pass		304
5	Python arrays		307

ASSIGNMENT QUESTIONS:

1. Explain conditional statements in python with syntax and example program?
2. Explain loop statements in python with syntax and example program?
3. Explain control statements in python with syntax and example program?
4. Define array? Explain array operations with functions in detail?
5. Write a python program

a) To find greatest of three numbers.
b) To check whether a given number is even or odd.
c) To find sum of digits in a given number.
d) To find factorial of a given number.
e) To check whether a given number is prime number or not.

ADDITIONAL RESOURCES:

Video Links:

https://www.youtube.com/watch?v=PqFKRqpHrjw&list=PLsyeobzWxl7poL9JTVyndKe62ieoN-MZ3&index=22

https://www.youtube.com/watch?v=vaysJAMDaZw

https://www.youtube.com/watch?v=fEsHK2OzTd4&list=PLLOxZwkBK52DmuHRO3UNpqAzDF57FtIxk

Study Material:

https://drive.google.com/file/d/1-QtPh78Xp5gjIza0ix3g5htGZ8g-nwU9/view?usp=sharing

PPT Link:

https://drive.google.com/file/d/1wOIL1j8VaZtpm7cA-A1O7Wtd8wLAT-D_/view?usp=sharing

UNIT-3

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Functions , function types and functions with parameters	Core Python Programming By Wesley J Chun	409
2	Types of functional arguments		428
3	Fruitful functions		430
4	Scope of variables		453
5	Recursive and Powerful Lambda functions in python		466

ASSIGNMENT QUESTIONS:

1. Define function and explain the following function types with example programs
   a. Built-in functions b. User defined functions c. Recursive functions
   b. Lambda functions
2. Define types of functional arguments with example programs?
3. Explain LAMBDA functions in detail with example program?
4. Explain fruitful functions with example program?
5. Explain local and global variables in python with example programs?
6. Write a python program
   a. To find factorial of a number using recursion
   b. To find GCD of two numbers using functions
   c. To print Fibonacci series.

ADDITIONAL RESOURCES:

Video Links:

https://www.youtube.com/watch?v=BVfCWuca9nw&list=PLsyeobzWxl7poL9JTVyndKe62ieoN-MZ3&index=36

https://www.youtube.com/watch?v=eci9iU_s6Ag&list=PLsyeobzWxl7poL9JTVyndKe62ieoN-MZ3&index=38

https://www.youtube.com/watch?v=mpnBNGOSplA&list=PLS1QulWo1RIYt4e0WnBp-ZjCNq8X0FX0J

Study Material:

https://drive.google.com/file/d/1T7uhFtnXf9JNIUHgQHUgNp5KsfMkNOD0/view?usp=sharing

PPT Link:

https://drive.google.com/file/d/1us5TF0RUyQe07a2PsW6kH3D7iPEC4TeM/view?usp=sharing

UNIT-4

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Data structures in python	Learning Python, Mark Lutz, Orielly	247
2	List, Tuple, Dictionary, Set, Sequence		248
3	Comprehensions in python		605
4	Manipulation functions		253
5	List, Tuple, Dictionary, Set built-in functions		254

ASSIGNMENT QUESTIONS:

1. Define data structures in python? Explain the following with examples
   a) List and its functions b) Tuple and its functions c) Dictionary and its functions
   b) Set and its functions
2. Define sequence and explain the basic operations of sequence with example programs?
3. Explain comprehensions in detail with example programs?

ADDITIONAL RESOURCES:

Video Links:

https://www.youtube.com/watch?v=xOuRE3IuEB8

https://www.youtube.com/watch?v=m9n2f9lhtrw

https://www.youtube.com/watch?v=lFi3aenAfZU

Study Material:

https://drive.google.com/file/d/1pqcZ3rCS_DVTZs5Ki4918UJ8bVu2Z-Rn/view?usp=sharing

PPT Link:

https://drive.google.com/file/d/1CIrw48Ke4gYueUa_Ywgqp3Q6rXE5qMYd/view?usp=sharing

UNIT-5

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Sorting: Bubble sort, selection sort, insertion sort	data structures and algorithms in python By Benjamin Baka	205
2	Merge sort, Quick sort		215
3	Linked list		92
4	Stack		110
5	Queue		117

ASSIGNMENT QUESTIONS:

1. Explain the following sorting techniques with example and program
a) Quick sort b) Merge sort
2. Explain the following sorting techniques with example and program
a) Bubble sort b) Selection sort c) Insertion sort
3. Explain linked list with example program?
4. Explain stack with example program?
5. Explain Queue with example program?

ADDITIONAL RESOURCES:

Video Links:

https://www.youtube.com/watch?v=Vca808JTbI8

https://www.youtube.com/watch?v=zjzQVKqYr1U&list=PLzgPDYo_3xunyLTJlmoH8IAUvet4-Ka0y&index=7

https://www.youtube.com/watch?v=Yd-0cXEBNFo

Study Material:

https://drive.google.com/file/d/1I_WZg3q0OG8DntKmH_QTzGzIoK5DGAfH/view?usp=sharing

PPT Link:

https://drive.google.com/file/d/1W-US_Ay5-qda1TR5a4TpyvJF692U59f7/view?usp=sharing

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE COVERAGE SUMMARY A.Y:2019-20

II YEAR B. TECH II SEMESTER (C-SECTION)	PROBABILTY AND STATISTICS (R18A0024)

UNIT-1

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	RANDOM VARIABLES Single and multiple random variables -discrete and continuous. Probability distribution function, mass function and density function of probability distributions.Mathematical expectation and variance.	Fundamentals of Statistics by S.C.Gupta,Himalaya publishing house	13.1-13.22

- **ASSIGNMENT QUESTIONS: Available in digital Notes**

ADDITIONAL RESOURSES:

- NPTEL VIDEO LINKS:https://youtu.be/82Ad1orN-NA
- STUDY MATERIAL: Refer UNIT I Notes in DIGITAL NOTES from www.mrcet.ac.in
- PPTs:

UNIT-2

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	**Probability distributions** Binomial distribution – properties, mean and variance, Poisson distribution – properties, mean and variance and normal distribution – properties, mean and variance.	Fundamentals of Statistics by S.C.Gupta,Himalaya publishing house	14.1-14.67

- **ASSIGNMENT QUESTIONS: Available in digital Notes**

ADDITIONAL RESOURSES:

- NPTEL VIDEO LINKS: https://youtu.be/vqojqDds_eo
- https://youtu.be/FDcCwIBhPNU
- https://youtu.be/O-YhNpy7z3I

- https://youtu.be/mtbJbDwqWLE

- STUDY MATERIAL: Refer unit ii digital notes from www.mrcet.ac.in
- PPTs:

UNIT-3

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	**Correlation and Regression** Correlation -coefficient of correlation, rank correlation. Regression-regression coefficients, lines of regression.	Fundamentals of Statistics by S.C.Gupta,Himalaya publishing house	8.1-8.45 9.1-9.45

- **ASSIGNMENT QUESTIONS: Available in digital Notes**

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS: https://youtu.be/Ot-ztTT-9Jk
- STUDY MATERIAL: Refer unit iii digital notes

- PPTs:

UNIT-4

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	**Sampling** Sampling: Definitions of population, sampling, statistic, parameter - types of sampling - expected values of sample mean and variance, standard error - sampling distribution of means and variance. Estimation - point estimation and interval estimation.Testing of hypothesis: Null and Alternative hypothesis - Type I and Type II errors, critical region - confidence interval - Level of significance, one tailed and two tailed test.	Fundamentals of Statistics by S.C.Gupta,Himalaya publishing house	15.1-15.32 16.1-16.39

ASSIGNMENT QUESTIONS

1. If the population is3,6,9,15,27

   a) List all possible samples of size 3 that can be taken without replacement from finite population

   b) Calculate the mean of each of the sampling distribution of means

c) Find the standard deviation of sampling distribution of means

2. A population consist of five numbers 2,3,6,8 and 11. Consider all possible samples of size

two which can be drawn with replacement from this population .Find

a) The mean of the population

b) The standard deviation of the population

c) The mean of the sampling distribution of means and

d) The standard deviation of the sampling distribution of means

3. A random sample of size 100 is taken from a population with σ = 5.1 . Given that the

sample mean is $\bar{x}$ = 21.6 Construct a 95% confidence limits for the population mean .

4. A normal population has a mean of 0.1 and standard deviation of 2.1 . Find the probability

that mean of a sample of size 900 will be negative .

5. A random sample of size 64 is taken from a normal population with μ = 51.4

and σ = 6.8.What is the probability that the mean of the sample will a) exceed 52.9

b) fall between 50.5 and 52.3 c) be less than 50.6.

6. A manufacturer claimed that at least 95% of the equipment which he supplied to factory conformed to specifications . An examination of a sample of 200 pieces of equipment revealed that 180 were faulty .Test his claim at 5% an 1% LOS.

7. Write about i) critical region ii) one tailed and two tailed test

8. Define sample. Explain the different methods that are involved in selecting the sample.

9. Explain about i) Type I error ii) Type II error

10 .a)Explain the five step procedure for testing of hypothesis

b) Explain about i) point estimation ii) interval estimation

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS: https://youtu.be/UNDju3yphEE
- https://youtu.be/0WYhD2r9-u8

- STUDY MATERIAL: Refer unit 4 in digital notes from www.mrcet.ac.in

- PPTs:

UNIT-5

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	**Statistical Inferences** Large sample Tests: Test of significance - Large sample test for single mean, difference of means, single proportion, and difference of proportions. Small samples: Test for single mean, difference of means, test for ratio of variances (F-test) - Chi-square test for goodness of fit and independence of attributes	Fundamentals of Statistics by S.C.Gupta,Himalaya publishing house	17.1-17.26 18.1-18.27 19.1-19.37

- ASSIGNMENT QUESTIONS

1 .A die was thrown 9000 times and of these 3220 yielded a 3 or 4. Is this consistent with the hypothesis that the die was unbiased?

2. A sample of 400 items is taken from a population whose standard deviation is 10 . The mean of the sample is 40 . Test whether the sample has come from a population with mean 38 . Also calculate 95% confidence limits for the population.

3. A random sample of size 16 values from a normal population showed a mean of 53 and sum of squares of deviations from the mean equals to 150 . Can this sample be regarded as taken from the population having 56 as mean

4. A die is thrown 264 times with following results. Show that the die is biased [Given $\chi^2_{0.05} = 11.07$ for 5 d.f]

No. appeared on the die	1	2	3	4	5	6
Frequency	40	32	28	58	54	52

5.Two horses A and B were tested according to the time to run a particular track with the following results .

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	

Test whether the two horses have the same running capacity

6. Fit a Poisson distribution to the following data and test for its goodness of fit at 5% los

x	0	1	2	3	4
f	419	352	154	56	19

7.On the basis of information given below about the treatment of 200 patients suffering from disease , state whether the new treatment is comparatively

Superior to the conventional treatment.

Treatment	Favorable	Not Favorable	Total
New	60	30	90
Conventional	40	70	110

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS: https://www.slideshare.net/darlingjunior/hypothesis-testing
- https://www.youtube.com/playlist?list=PLEIbY8S8u_DKw6SSz7_v5TrgjNayL446j
- STUDY MATERIAL: Refer unit v in digital notes from www.mrcet.ac.in

- PPTs:

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DEPARTMENT OF MECHANICAL ENGINEERING

COURSE COVERAGE SUMMARY A.Y:2019-20

II YEAR B. TECH II SEMESTER (C-SECTION)	MANUFACTURING PROCESSES(R18A0311)

UNIT-1

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Introduction, Steps involved in Design of Casting	Durga publishing house & Pakirappa	7&8
2	Pattern,Types of Patterns and allowances	Durga publishing house & Pakirappa	9 to16
3	Principles of Gating and its types	Durga publishing house & Pakirappa	54 to 59
4	Risers- Types	Durga publishing house & Pakirappa	61&62
5	Casting defects	Durga publishing house & Pakirappa	111 to 114
6	Melting of metal by cupola operation.	Durga publishing house & Pakirappa	96
7	Metal mould casting- Low & High Pressure, Continuous casting, Squeeze casting,	Durga publishing house & Pakirappa	80 to 82
8	vacuum mould casting, Evaporative pattern casting, Ceramic shell casting.	Durga publishing house & Pakirappa	83 to 90

ASSIGNMENT QUESTIONS:

1. what is a pattern ? Explain all the types of patterns with neat sketch?Also explain about pattern allowances?
2. Write about any 10 casting defects with proper sketches write about freezing of pure metal and alloy?
3. with the help of suitable diagram discuss the following casting methods?

A) centrifugal casting and its types b)investment casting c)die casting

4a) Draw a neat sketch of cupola furnace and explain its operation?

4b)Describe the solidification of pure metal with a neat sketch?

5)a)Explain squeeze casting ,vac cum casting with neat sketches?

5b)Explain the principle of Evaparative pattern casting with neat sketches?

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
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- STUDY MATERIAL:Available in digital Note and will send the books in what's up group

- PPTs: PPTs available in Digital notes

UNIT-2

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Introduction, Classification –Types of welds and welded joints, Welding Positions	Durga publishing house & Pakirappa	131 to 135
2	Gas, Arc, Forge, Resistance,	Durga publishing house & Pakirappa	141 to 148
	Soldering & Brazing.	Durga publishing house & Pakirappa	237 to 240
3	Thermit and Plasma (Air and water) welding. Heat affected zones in welding.	Durga publishing house & Pakirappa	203,204
4	welding defects – causes and remedies	Durga publishing house & Pakirappa	217&218
4	Destructive & Nondestructive testing of welds.	Durga publishing house & Pakirappa	219 to 223
5	Oxy – Acetylene Gas cutting, Water Plasma	Durga publishing house & Pakirappa	152,153
6	Electron beam Welding, Laser beam welding.	Durga publishing house & Pakirappa	206,207
7	Friction Stir Welding, Heat flow welding,	Durga publishing house & Pakirappa	198,199
8	Ultrasonic Welding.	Durga publishing house & Pakirappa	200

ASSIGNMENT QUESTIONS:

1a) Explain TIG & MIG welding process with neat sketches?

1B)explain Resistance and spot welding process with neat sketches?

2. a)Explain different types of welding defects with neat sketches?

B) what is gas welding ? Explain different types of flames with neat sketches?

3a)Explain laser beam welding & Electron beam welding process with neatsketches?

3b)explain soldering and brazing?

4a) Discuss forge welding and friction welding process with neat sketches?

4b)Explain arc welding process with neat sketch and its applications?

5a)Explain upset welding and plasma arc welding process with neat sketches?

5b) explain different types of welding joints and weld beads with neat sketches?

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:

- STUDY MATERIAL:Available in digital Note and will send the books in what's up group

- PPTs: PPTs available in Digital notes

UNIT-3

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1	Introduction, Strain Hardening, Recovery, Recrystallization and Grain growth.	Durga publishing house & Pakirappa	246 to 250
2	Forming processes - Bending, Coining, embossing etc.	Durga publishing house & Pakirappa	329,330
3	Rolling and types of Rolling and Roll mills,	Durga publishing house & Pakirappa	254 to 257
4	Injection and blow molding.	Durga publishing house & Pakirappa	353 to 356
5	Electro Magnetic Forming,Explosive Forming, ElectroHydraulic Forming,Stretch Forming, Contour Roll forming.	Durga publishing house & Pakirappa	337,338

ASSIGNMENT QUESTIONS:

1. Explain Recovery, Recrystallization, grain growth with neat sketch?
2. Explain bending, coining, embossing &strain hardening process with neat sketches?
3. Explain theory of rolling? What are the types of rolling mills with neat sketches?
4. Explain Injection and blow molding process with neat sketches?

5 a) Explain Electromagnetic forming& explosive forming process with neat sketches?

b) Explain stretch forming & electrohydraulic forming process with neat sketches?

ADDITIONAL RESOURSES:

- NPTL VIDEO LINKS:
- STUDY MATERIAL:Available in digital Note and will send the books in what's up group
- PPTs: PPTs available in Digital notes

UNIT-4

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1.	Basic Extrusion & Types	Mfg. Tech. Vol. I by PN Rao	279
2.	Forging Operation and its classification	Mfg. Tech. Vol. I by PN Rao	253
3.	Drawing: Wire & Tube Drawing	Mfg. Tech. Vol. I by PN Rao	287-290, 310
4.	Swaging, Blanking & Piercing	Mfg. Tech. Vol. I by PN Rao	291, 304
5.	Punching & Trimming	Mfg. Tech. Vol. I by PN Rao	304

ASSIGNMENT QUESTIONS:

1. What is extrusion? Classify the types and explain with neat sketches?
2. What is forging? Classify the types?

3. Explain the various forging operations and list the forging defects.
4. Sketch and explain forging hammers. What are the advantages of cold forging?
5. Explain Deep drawing process and its features

ADDITIONAL RESOURSES:

- NPTEL VIDEO LINKS: https://nptel.ac.in/courses/112107145/
- STUDY MATERIAL: Refer Digital Notes
- PPTs: Refer Digital Notes

UNIT-5

S.N.	Topic as per the syllabus	Textbook & Author	Pages
1.	Introduction to Additive manufacturing, Applications, Limitations	https://www.ge.com/additive/additive-manufacturing/information/additive-manufacturing-processes	
2.	Classification of Rapid Mfg. Process		
3.	Traditional Prototyping vs Rapid Prototyping		
4.	Photo Polymerization		
5.	Stereo Lithography, Powder Bed Fusion		
6.	Selective Laser Sintering, EBM, fused Deposition Modeling		
7.	3D Printing, Laminated Object Mfg.,		
8.	Laser Engg. Net Shaping and Direct Metal Deposition		

ASSIGNMENT QUESTIONS:

- Refer Digital Notes

ADDITIONAL RESOURSES:

- NPTEL VIDEO LINKS: https://www.ge.com/additive/additive-manufacturing/information/additive-manufacturing-processes
- STUDY MATERIAL: Refer Digital Notes