

# GOVERNMENT POLYTECHNIC ASTHAWAN, NALANDA(BIHAR)

(Department of Mechanical Engineering)

## Lecture Plan

<b>Name of the Faculty</b>		<b>BRAJESH KISHOR</b>		
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<b>Semester / Branch</b>		<b>3<sup>rd</sup> / Mechanical Engineering</b>		
<b>Subject Name(Subject Code)</b>		<b>Mechanical Engineering Materials , 1625304</b>		
<b>Lecture / Week</b>		<b>3 Periods / Week</b>		
<b>THEORY</b>				
<b>Units</b>	<b>Week</b>	<b>Lectures Day</b>	<b>Topics</b>	<b>Methods of Teaching</b>
<b>1</b> Engineering Materials and their Properties	1	1	Introduction, Classification and Application of Engineering materials	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	I.S	Google

			specification of materials like plain carbon steel, Grey Cast iron, low alloy steels & bearing Materials.	Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		3	Properties of metals, Physical Properties – Structure, Density, Melting point.	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
	2	1	Mechanical Properties – Strength, elasticity, ductility, malleability, plasticity, toughness, hardness, hardenability	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	brittleness,	Google

			fatigue, thermal conductivity, electrical conductivity, thermal coefficient of linear expansion	Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		3	Introduction to Corrosion, types of Corrosion, Corrosion resisting materials.	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
	3	1	Assignment/ Quiz for Unit 1	Google Classroom / Google Form/ What's App Group
		2	Characteristics and application of ferrous metals	Google Classroom / What's App Group/ Hand

<b>2</b> <b>Ferrous Metals and Alloys</b>				Written Notes/ PDF/ YouTube Video Link
		3	Phase equilibrium diagram for Iron and Iron Carbide.	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
	4	1	Flow diagram for production of Iron and Steel, Classification,	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Composition and uses of cast iron, effect of sulphur, silicon and	Google Classroom / What's App Group/ Hand

			phosphorous.	Written Notes/ PDF/ YouTube Video Link
		3	Classification, composition and application of low carbon steel	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
	5	1	medium carbon steel and high carbon steel with their chemical composition	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Alloy Steels: - Low alloy steel, high alloy steel, tools steel & stainless steel.	Google Classroom / What's App Group/ Hand

				Written Notes/ PDF/ YouTube Video Link
		3	Effect of various alloying elements such as – Chromium, nickel,	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
	6	1	Manganese, molybdenum, tungsten, vanadium.	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Tool Steels: - High speed Steels (HSS), Hot & cold Working dies, shear,	Google Classroom / What's App Group/ Hand

			punches etc., properties & applications.	Written Notes/ PDF/ YouTube Video Link
		3	Magnetic materials: - Properties & Applications of commonly used magnetic materials (Permanent magnets and temporary magnets).	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
	7	1	Special Cutting Tool Materials – Diamond, Stelites & Tungsten Carbide	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Assignment/ Quiz for Unit 2	Google Classroom / Google Form/ What's

				App Group
<b>3</b> Non Ferrous Metals and Alloys		3	Properties, applications	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
	8	1	chemical compositions of Copper alloys (naval brass, muntz metal, Gun metal & bronzes)	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Aluminium alloys (Y alloy & duralumin)	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube



				Video Link
		3	bearing materials like white metals,	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
	9	1	Leaded bronzes & copper lead alloys.	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Desired properties of bearing materials	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube

<b>4</b> Heat Treatment of Steels	<b>10</b>			Video Link
		3	Assignment/ Quiz for Unit 3	Google Classroom / Google Form/ What's App Group
		1	Introduction to Heat treatment processes such as Annealing	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Introduction to Heat treatment processes such as subcritical annealing, Normalizing	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		3	Introduction to Heat treatment processes	Google Classroom / What's App

			such as Tempering	Group/ Hand Written Notes/ PDF/ YouTube Video Link
	11	1	Principle, Advantages,	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Limitations and applications.	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		3	Surface Hardening - Methods of surface	Google Classroom / What's App

			hardening, i) case hardening ii) Flame Hardening,	Group/ Hand Written Notes/ PDF/ YouTube Video Link
	12	1	Surface Hardening - Methods of surface hardening iii) Induction Hardening, iv) Nit riding, v) Carburizing	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Principle, advantages, limitations and applications	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		3	Assignment/ Quiz for Unit 4	Google Classroom / Google Form/

				What's App Group
<b>5</b> <b>Non Metallic Materials</b>	13	1	Polymeric Materials – Introduction to Polymers- types, characteristics properties and uses of Thermoplastic	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Thermosetting Plastics & Rubbers	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		3	Thermoplastic Plastics - characteristics and uses of ABS, Acrylics, Nylons and Vinyl's	Google Classroom / What's App Group/ Hand Written Notes/ PDF/

				YouTube Video Link
	14	1	Thermosetting Plastics - Characteristics and uses of polyesters, Epoxies, Melamine's & Bakelite's.	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Rubbers – Neoprene, Butadiene, Buna & Silicon's – Properties & applications.	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		3	Properties and applications of following Engineering Materials – Ceramics, Abrasive, Adhesive	Google Classroom / What's App Group/ Hand Written Notes/ PDF/

				YouTube Video Link
	15	1	Insulating materials such as Cork, Asbestos, Thermo Cole and Glass Wool	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Introduction to Composite Materials – Laminated & Fibre reinforced materials - Structure, Properties & Applications.	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		3	Assignment / Quiz for Unit 5	Google Classroom / Google Form/ What's App Group
	16	1	Advantages, limitations and	Google Classroom / What's

<b>6</b> <b>Powder Metallurgy &amp; Nondestructive Testing</b>			applications of Powder Metallurgy for engineering products.	App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Brief Description of Process of Powder Metallurgy – Powder making, blending	Google Classroom / What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		3	Brief Description of Process of Powder Metallurgy – compacting, sintering, infiltration & impregnation	Google Classroom/ What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
	17	1	Applications of Powder metallurgy for tungsten	Google Classroom/ What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link



			carbide tip tools & porous bearing.	
		2	Importance of Non-destructive testing,	Google Classroom/ What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		3	Difference between Destructive and Non-destructive testing.	Google Classroom/ What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
	18	1	Non-destructive testing methods - Radiography (X-Ray & Gamma Ray), Ultrasonic crack detection	Google Classroom/ What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link
		2	Dye penetrant test, Magnaflux test – Comparison & applications.	Google Classroom/ What's App Group/ Hand Written Notes/ PDF/ YouTube Video Link

		3	Assignment /Quiz for Unit 6	Google Classroom/ Google Form/ What's App Group
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