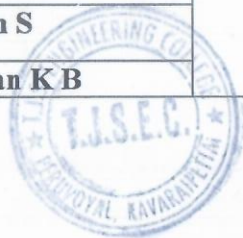





T.J.S. Engineering College
T.J.S. Nagar, Near Redhills, Gummidipoondi Taluk,
Thiruvallur District - 601206
Department of Mechanical Engineering
Project Details for the Academic Year 2021-22



Batch No.	Reg.no	Student Name	Project Name	Project Guide
1	112818114302	Bhuvaneshwaran S	Investigation of Mechanical behavior of newly developed tamarind seed reinforced bio composite	Dr.K.Kamal Babu
	112818114305	Umesh R		
	112818114306	Videeshwaran M		
	112818114307	Vishnuram R		
2	112818114012	Opinath S	Design and Analysis of an Excavator bucket and teeth	Mr.S.Sathya Moorthi
	112818114018	Kamaraj B		
	112818114020	Parthikeyan R		
	112818114026	Mohana Prasath S		
3	112818114010	Dinesh P	Design and Fabrication of IOT Valve for processing plants and crop field	Mr.M.Vinoth Kumar
	112818114013	Hayath Basha K		
	112818114014	Janarthan S		
	112818114023	Kumara Guru G		
4	112818114007	Bodilingalapadu Vasanth	Experimental Investigation of ballistic Impact Behavior of Eco Polymer Composite	Mr.M.Prakash
	112818114021	Katuru Bhuvan Chandu		
	112818114024	Kuppan M		
	112818114027	Mohendar D		
5	112818114002	Aakash B	Design and Fabrication of Gearless power transmission system	Mr.S.Sathya Moorthi
	112818114029	Nagaraj V		
	112818114032	Prabakaran S		
	112818114038	Sri Krishnan K B		




PRINCIPAL
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipettai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.

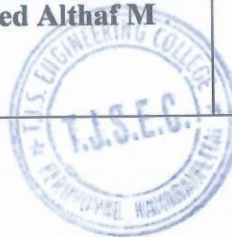



T.J.S. Engineering College
TJS Nagar. Near Redhills, Gurmidipoondi Taluk,
Thiruvallur District - 601206

Department of Mechanical Engineering
Project Details for the Academic Year 2021-22



6	112818114034	Raghul R	Evaluation of mode 1 fracture in reinforced biocomposite with 3layer jute fiber and tamarind seed powder	Mr.M.Prakash
	112818114036	Riyaz Khan K		
	112818114040	Sharan P		
	112818114041	Snega K		
7	112818114004	Aswin P V	Design and material optimization of colling Fins in Electric Vehicle Motor Housing	Mr.R.Sathish Kumar
	112818114025	Logesh R		
	112818114039	Sai Kumar G R		
	112818114047	Vignesh Kumar S		
8	112818114008	Chattu Gunakar	Tribological Analysis of Tamarind Filler Reinforced polymer Composite	Dr.K.Kamal Babu
	112818114009	Chittiboina Murali Krishna		
	112818114019	Kanderi Naveen		
	112818114001	Abinesh V		
9	112818114031	Pavan Kumar S	Solar Grass Cutter Machine	Mr.M.Vinoth Kumar
	112818114042	Sundharesan L		
	112818114043	Sunil Raj J		
	112818114045	Tamil Priyan C		
10	112818114005	Athiqhur Rahman M	Design and Analysis of Car Crashing Element	Mr.S.Sathya Moorthi
	112818114028	Mouli Chandru D		
	112818114501	Rajesh P		
	112818114701	Mohammed Althaf M		




PRINCIPAL
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipettai,
Thiruvallur District,
Tamil Nadu - 601206



T.J.S. Engineering College
T.J.S. Nagar, Near Redhills, Gummidipoondi Taluk,
Thiruvallur District - 601206

Department of Mechanical Engineering
Project Details for the Academic Year 2021-22



11	112318114003	Akash S	Design and Fabrication of Hydraulic Traction Beam	Mr.M.Prakash(Sr)
	112318114006	Bala Murugan S		
	112318114304	Subash S		
	112318114702	Rahul S		
12	112818114016	Jibin Jose K	Design and Analysis of Leaf spring in Maxi Truck	Mr.R.Sathish Kumar
	112818114033	Puruothaman M		
	112818114035	Rajesh P		
	112818114046	Vasanthraj P		
13	112818114037	Sadu Venkatesh	Evaluation of thermo mechanical (DMA & TGA) Analysis of Tamarind powder reinforced	Mr.M.Prakash
	112818114048	Vijayakumar P		
	112818114301	Amasa Nanda Kumar		
	112818114303	Pavan Kumar R		
14	112818114022	Krishna Bharathi H	Design and Fabrication of Hybrid Differential	Mr.M.Prakash(Sr)

Project Coordinator



HOD

Principal
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipeetai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.

**INVESTIGATION ON MECHANICAL BEHAVIOUR OF NEWLY
DEVELOPED TAMARIND SEED REINFORCED BIO COMPOSITE**

A PROJECT REPORT

Submitted by

S.BHUVANESHWARAN

(112818114302)

R.UMESH

(112818114305)

M.VAIDEESHWARAN

(112818114306)

R.VISHNUJ RAM

(112818114307)

In partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

MECHANICAL ENGINEERING



T.J.S. ENGINEERING COLLEGE



ANNA UNIVERSITY:CHENNAI 600025

JUNE 2022



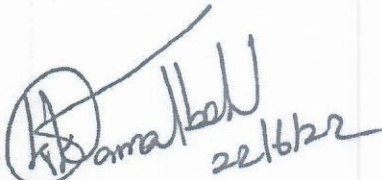
J. K. S.
PRINCIPAL

T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipeetai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.

ANNAUNIVERSITY:CHENNAI600 025

BONAFIDE CERTIFICATE

Certified that this project report "INVESTIGATION ON MECHANICAL BEHAVIOUR OF NEWLY DEVELOPED TAMARIND SEED REINFORCED BIO COMPOSITE" is the bonafide work of "S.BHUVANESHWARAN [112818114302] R.UMESH [112818114305] M.VAIDEESHWARAN [112818114306] R.VISHNU RAM [112818114307]", who carried out the project work under my supervision.



SIGNATURE

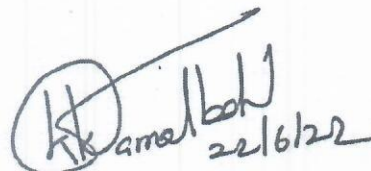
Dr. K. KAMAL SASU M.E., Ph.D (NIT-T)

Professor & Head Of

The Department

Department Of Mechanical Engineering

T.J.S. Engineering college



SIGNATURE

Dr. K. KAMAL BABU M.E., Ph.D (NIT-T)


Supervisor

Assistant Professor

Department Of Mechanical Engineering

T.J.S. Engineering college

Submitted for University project viva -voce examination held on 22.6.22



INTERNAL EXAMINER

22/6/22



EXTERNAL EXAMINER



PRINCIPAL
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipettai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.

ABSTRACT

The paper presents the study of the tensile strength, flexural strength and impact energy absorption characteristics of the tamarind seed jute fiber with a view to using it as an alternative sustainable engineering material for various practical applications. Tamarind seed jute fiber reinforced epoxy resin matrix composites have been developed by hand lay-up technique with varying process parameters, such as fiber condition (treated untreated), different type of composite of tamarind seed jute fibers. The effects of these factors on the tensile strength, flexural strength and impact energy of the components were studied. From this, the maximum tensile strength varies from 1300N to 48.3N, similarly the maximum flexural strength varies from 0.150KN to 0.085KN and the maximum impact energy varies from 0.4J to 0.1J as a function of fiber volume fraction. The optimum compressive strength and flexural strength and impact energy were obtained at the composition. The application at present, tamarind seed jute fiber / epoxy composites are widely used in various engineering and structural applications such as electrical industries.



A handwritten signature in green ink, appearing to read 'J. S. S.', written over the printed name of the principal.

PRINCIPAL

T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipeetai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.

ENGINEERING METALLURGY

L	T	P	C
3	0	0	3

OBJECTIVE:

- To impart knowledge on the structure, properties, treatment, testing and applications of metals and non-metallic materials so as to identify and select suitable materials for various engineering applications.

UNIT I

ALLOYS AND PHASE DIAGRAMS

Constitution of alloys – Solid solutions, substitutional and interstitial – phase diagrams, isomorphous, eutectic, eutectoid, peritectic, and peritectoid reactions, Iron – carbon equilibrium diagram. Classification of steel and cast Iron microstructure, properties and application. 9

UNIT II

HEAT TREATMENT

Definition – Full annealing, stress relief, recrystallisation and spheroidising – normalising, hardening and Tempering of steel. Isothermal transformation diagrams – cooling curves superimposed on I.T. diagram CCR – Hardenability, Jominy end quench test - Austempering, martempering – case hardening, carburizing, Nitriding, cyaniding, carbonitriding – Flame and Induction hardening – Vacuum and Plasma hardening. 9

UNIT III

FERROUS AND NON-FERROUS METALS

Effect of alloying additions on steel- α and β stabilisers– stainless and tool steels – HSLA, Maraging steels – Cast Iron - Grey, white, malleable, spheroidal – alloy cast irons, Copper and copper alloys – Brass, Bronze and Cupronickel – Aluminium and Al-Cu – precipitation strengthening treatment – Bearing alloys, Mg-alloys, Ni-based super alloys and Titanium alloys. 9

UNIT IV

NON-METALLIC MATERIALS

Polymers – types of polymer, commodity and engineering polymers – Properties and applications of various thermosetting and thermoplastic polymers (PP, PS, PVC, PMMA, PET, PC, PA, ABS, PI, BA, PPO, PPS, PEEK, PTFE, Polymers – Urea and Phenol formaldehydes)- Engineering Ceramics – Properties and applications of Al_2O_3 , SiC, Si_3N_4 , PSZ and SIALON –Composites- Classifications- Metal Matrix and FRP - Applications of Composites. 9

UNIT V

MECHANICAL PROPERTIES AND DEFORMATION MECHANISMS

Mechanisms of plastic deformation, slip and twinning – Types of fracture – Testing of materials under tension, compression and shear loads – Hardness tests (Brinell, Vickers and Rockwell), hardness tests, Impact test Izod and Charpy, fatigue and creep failure mechanisms. 9

TOTAL: 45 PERIODS

OUTCOMES


Upon the completion of this course the students will be able to

- CO1 Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.
- CO2 Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
- CO3 Clarify the effect of alloying elements on ferrous and non-ferrous metals
- CO4 Summarize the properties and applications of non metallic materials.
- CO5 Explain the testing of mechanical properties. .

TEXT BOOKS:

- Avner, S.H., "Introduction to Physical Metallurgy", McGraw Hill Book Company, 1997.
- Williams D Callister, "Material Science and Engineering" Wiley India Pvt Ltd, Revised Indian Edition 2014




PRINCIPAL
T.J.S. ENGINEERING COLLEGE,
Peruvoyal, Kavaraipeetai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.

REFERENCES:

1. Kenneth G. Budinski and Michael K. Budinski, "Engineering Materials", Prentice Hall of India Private Limited, 2010.
2. Raghavan.V, "Materials Science and Engineering", Prentice Hall of India Pvt. Ltd., 2015.
3. U.C.Jindal : Material Science and Metallurgy, "Engineering Materials and Metallurgy", First Edition, Dorling Kindersley, 2012
4. Upadhyay. G.S. and Anish Upadhyay, "Materials Science and Engineering", Viva Books Pvt. Ltd., New Delhi, 2006.



J. [Signature]

PRINCIPAL
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipeetai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.

OBJECTIVES:

- To understand the concepts of stress, strain, principal stresses and principal planes.
- To study the concept of shearing force and bending moment due to external loads in determinate beams and their effect on stresses.
- To determine stresses and deformation in circular shafts and helical spring due to torsion.
- To compute slopes and deflections in determinate beams by various methods.
- To study the stresses and deformations induced in thin and thick shells.

UNIT I STRESS, STRAIN AND DEFORMATION OF SOLIDS 9

Rigid bodies and deformable solids – Tension, Compression and Shear Stresses – Deformation of simple and compound bars – Thermal stresses – Elastic constants – Volumetric strains – Stresses on inclined planes – principal stresses and principal planes – Mohr's circle of stress.

UNIT II TRANSVERSE LOADING ON BEAMS AND STRESSES IN BEAM 9

Beams – types transverse loading on beams – Shear force and bending moment in beams – Cantilevers – Simply supported beams and over – hanging beams. Theory of simple bending – bending stress distribution – Load carrying capacity – Proportioning of sections – Flitched beams – Shear stress distribution.

UNIT III TORSION 9

Torsion formulation stresses and deformation in circular and hollow shafts – Stepped shafts – Deflection in shafts fixed at the both ends – Stresses in helical springs – Deflection of helical springs, carriage springs.

UNIT IV DEFLECTION OF BEAMS 9

Double Integration method – Macaulay's method – Area moment method for computation of slopes and deflections in beams – Conjugate beam and strain energy – Maxwell's reciprocal theorems.

UNIT V THIN CYLINDERS, SPHERES AND THICK CYLINDERS 9

Stresses in thin cylindrical shell due to internal pressure circumferential and longitudinal stresses and deformation in thin and thick cylinders – spherical shells subjected to internal pressure – Deformation in spherical shells – Lamé's theorem.

TOTAL: 45 PERIODS

J. K. S.
PRINCIPAL
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipeetai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.

OUTCOMES

Students will be able to

- Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.
- Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
- Apply basic equation of simple torsion in designing of shafts and helical spring
- Calculate the slope and deflection in beams using different methods.
- Analyze and design thin and thick shells for the applied internal and external pressures.

TEXT BOOKS:

1. Bansal, R.K., "Strength of Materials", Laxmi Publications (P) Ltd., 2016
2. Jindal U.C., "Strength of Materials", Asian Books Pvt. Ltd., New Delhi, 2009

REFERENCES:

1. Egor. P. Popov "Engineering Mechanics of Solids" Prentice Hall of India, New Delhi, 2002
2. Ferdinand P. Beer, Russell Johnson, J.r. and John J. Dewole "Mechanics of Materials", Tata McGraw Hill Publishing 'co. Ltd., New Delhi, 2005.
3. Hibbeler, R.C., "Mechanics of Materials", Pearson Education, Low Price Edition, 2013
4. Subramanian R., "Strength of Materials", Oxford University Press, Oxford Higher Education Series, 2010.




PRINCIPAL
T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipettai,
Gummidipoondi Taluk,
Thiruvallur Dist - 601 206.