



Sri Vasavi Engineering College (Autonomous)

(Sponsored by Sri Vasavi Educational Society)

(Approved by AICTE, New Delhi & Permanently affiliated to JNTUK, Kakinada)

(Accredited by NBA & NAAC with 'A' Grade, Recognized by UGC Under Section 2(f) & 12(B))

Pedatadepalli, Tadepalligudem, W.G.Dt, A.P-534101

Department of Mechanical Engineering

Agenda for the 2nd BOS meeting of the department on 21-04-2019

Item No.1

Suggest modifications for the existing course structure.

Item No.2

Propose syllabi for the courses offered in III and IV semesters of B.Tech programme of Academic Year 2019-20.

Item No.3

Review of the syllabi approved for the Academic Year 2018-19 for I & II semester for B.Tech & M.Techprogramme.



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DEPARTMENT OF MECHANICAL ENGINEERING

Date:22-04-2019

Second meeting of BOS in Mechanical Engineering department along with external members is held on 21/4/2019 at 10.00 am in the Dassault Laboratory of Mechanical Engineering department.

The following members are present.

S. No	Name of the BOS Members
1.	Dr. N.MohanaRao, Professor &CE, JNTUK,Kakinada
2.	Dr. R.V. Chalam, Professor,NIT,Warangal
3.	Dr. A. Krishnaiah, Professor, Osmania University, Hyderabad
4.	Sri S.S. SubramanyaSastry, DGM,Cyient, Hyderabad
5.	Sri A.Sai Krishna, Alumni,Maruthi design and engg. Pvt.ltd ,Bangalore
6.	Dr. G.V.N.S.R. RatnakaraRao, Professor &Principal, SVEC
7.	Dr. M.V. Ramesh, Chairman & HOD, SVEC
8.	All faculty members of the department

Minutes of meeting

Chairman welcomed all the BOS members and introduced to all the BOS-internal members.

Item No. 1: Suggest modifications for the existing course structure.

- Course named Computer aided Engineering Drawing Practice(CAEDP)(course code.V18MEL04)is removed.
- Condition monitoring &Machine Learning(coursecode.V18MET44)and Entrepreneurship (Course code.V18MET45)areincluded under the group of Open Elective –III in VII semester.
- Few courses suggested during previous meetingare rearranged as mentioned follows:

S.No.	Code	Name of the Course	Planned	Revised plan
1	V18MET06	Theory of Machines-1	III semester	IV semester
2	V18MET09	Materials Engineering	IV semester	III semester
3	V18MET10	Metrology	IV semester	VI semester
4	V18MEL06	Metrology &Instrumentation &Control Systems lab	IV semester	VI semester
5	V18MET14	Manufacturing Processes	V semester	IV semester
6	V18MEL09	Heat Transfer lab	V semester	VI semester
7	V18MET17	Metal Cutting & Machine Tools	VI semester	V semester
8	V18MEL10	Thermal Engineering lab	VI semester	V semester
9	V18MEL11	Manufacturing Processes lab	VI semester	IV semester


- The revised course structure offered is attached in Annexure-I.
- The courses Employability skills-I (course code.V18ENT03)& Employability skills - II (course code.V18ENT04) offered by BOS of English have been renamed as Professional Communication Skills-I((course code.V18ENT03) & Professional Communication Skills – II(course code.V18ENT04)in III and IV semesters respectively.
- The course code of Constitution of IndiaV18ENT07offered by BOS of English has been changed to V18ENT11in IV semester.
- The approved courses syllabi for Professional Communication Skills –I(course code.V18ENT03)& Professional Communication Skills –II(course code.V18ENT04) is attached in Annexure-II.

Item No. 2: Propose syllabi for the courses offered in III and IV semesters of B.Tech programme of Academic Year 2019-20.

- The approved syllabi for the courses is attached in Annexure-III.

Item No. 3: Review of the syllabi approved for the Academic Year 2018-19, I & II semester for B.Tech & M.Tech programme.

- No changes are suggested by the External BOS members.


Chairman (Head –ME)
Head of the Department
Mechanical Engineering
Sri Vasavi Engineering College
TADEPALLIGUDEM-534107

ANNEXURE - I

COURSE STRUCTURE OF FIRST YEAR B.TECH (ME) (For 2018 - 2019 Admitted Batch)

I SEMESTER

S.No	Course Code	Course Name	L	T	P	C
1	V18ENT01	English – I	2	0	0	MNC
2	V18MAT01	Engineering Mathematics – I	3	1	0	4
3	V18PHT01	Optics And Waves	3	1	0	4
4	V18EET01	Basic Electrical and Electronics Engineering	3	1	0	4
5	V18CHT02	Environmental Studies	3	0	0	MNC
6	V18ENL01	English Communication Skills Lab - I	0	0	2	MNC
7	V18MEL01	Engineering & IT Workshop	0	0	3	1.5
8	V18EEL01	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5
9	V18PHL01	Optics And Waves Lab	0	0	3	1.5
Total			14	3	11	16.5

Total Contact Hours: 28

II SEMESTER

S.No	Course Code	Course Name	L	T	P	C
1	V18ENT02	English – II	2	0	0	2
2	V18MAT02	Engineering Mathematics – II	3	1	0	4
3	V18CHT01	Engineering Chemistry	3	1	0	4
4	V18CST01	Programming in C for problem solving	3	0	0	3
5	V18MET01	Engineering Graphics	1	0	3	2.5
6	V18ENL02	English Communication Skills Lab - II	0	0	2	1
7	V18CSL01	Programming lab in C for problem solving	0	0	3	1.5
8	V18CHL01	Engineering Chemistry Lab	0	0	3	1.5
Total			12	2	11	19.5

Total Contact Hours: 25

- **V18MET02** - Introduction to Engineering Mechanics (EEE)

II B.Tech.

III Semester						
S.No.	Course Code	Course	L	T	P	Credits
1	V18MAT04	Probability & Statistics	3	1	0	4
2	V18MET03	Engineering Mechanics	3	1	0	4
3	V18MET04	Thermodynamics	3	1	0	4
4	V18MET05	Fluid Mechanics & Fluid Machines	3	0	0	3
5	V18MET09	Materials Engineering	3	0	0	3
6	V18MEL02	Machine Drawing	0	0	3	1.5
7	V18MEL03	Fluid Mechanics & Fluid Machines Lab	0	0	3	1.5
8	V18ENT03	Professional Communication Skills-I	3	0	0	MNC
			18	3	6	21

Contact hours: 27

IV Semester						
S.No.	Course Code	Course	L	T	P	Credits
1	V18MET07	Applied Thermodynamics	3	0	0	3
2	V18MET08	Mechanics of Solids	3	1	0	4
3	V18MET06	Theory of Machines - I	3	0	0	3
4	V18MET14	Manufacturing Processes	3	0	0	3
5	V18MET11	Instrumentation & Control Systems	3	0	0	3
6	V18MEL05	Mechanics of Solids & Materials Engineering Lab	0	0	3	1.5
7	V18MEL11	Manufacturing Process Lab	0	0	3	1.5
8	V18ENT11	Constitution of India	2	0	0	MNC
9	V18ENT04	Professional Communication Skills-II	3	0	0	MNC
			20	1	6	19

Contact hours: 27

III B. Tech

V Semester						
S.No.	Course Code	Course	L	T	P	Credits
1	V18MET13	Heat Transfer	3	1	0	4
2		OPEN ELECTIVE-I (Offered by Dept.)	3	0	0	3
3	V18MET17	Metal Cutting & Machine Tools	3	0	0	3
4	V18MET15	Theory of Machines - II	3	1	0	4
5	V18MET16	Design of Machine Elements- I	3	0	0	3
6	V18MEL16	Metal Cutting & Machine Tools Lab	0	0	3	1.5
7	V18MEL08	Theory of Machines Lab	0	0	3	1.5
8	V18MEL10	Thermal Engineering Lab	0	0	3	1.5
9	V18ENT08	Essence of Indian Traditional Knowledge	2	0	0	MNC
10	V18ENT05	Employability Skills-III	4	0	0	MNC
			21	2	6	20

Contact hours: 29

VI Semester						
S.No.	Course Code	Course	L	T	P	Credits
1	V18MET10	Metrology	3	0	0	3
2	V18MET18	Design of Machine Elements -II	3	1	0	4
3	V18MBET51	Managerial Economics and Financial Analysis (Humanities)	3	0	0	3
4	V18MET19	Robotics	3	0	0	3
5		Open Elective-II (From other Dept.s)	3	0	0	3
6	V18MEL06	Metrology and Instrumentation & Control Systems Lab	0	0	3	1.5
7	V18MEL09	Heat Transfer Lab	0	0	3	1.5
8	V18ENT06	Employability Skills-IV	4	0	0	MNC
			19	1	6	19

Contact hours: 26

IV B. Tech

VII Semester						
S.No.	Course Code	Course	L	T	P	Credits
1	V18MET20	Automation in manufacturing	3	0	0	3
	V18MET21	Operation Research (Humanities)	3	1	0	4
	ELECTIVE-1	V18MET22 -Industrial Engineering and management V18MET23 -Composite Materials V18MET24 -Refrigeration & Air Conditioning	3	1	0	4
.2	ELECTIVE-2	V18MET25 -Total Quality Management V18MET26 - Finite Element Methods V18MET27 - Micro Electro Mechanical Systems	3	0	0	3
5		Open Elective-III (From other Dept.s)	3	0	0	3
6	V18MEL12	Simulation Lab	0	0	3	1.5
7	V18MEL13	Production Drawing Lab	0	0	3	MNC
8	V18MEL14	Project Work –PART-A	0	0	8	4
			15	2	14	22.5

Contact hours: 31

VIII Semester						
S.No.	Course Code	Course	L	T	P	Credits
1		OPEN ELECTIVE-IV (Offered by Dept.)	3	0	0	3
2	ELECTIVE-3	V18MET28 - Automobile Engineering V18MET29 - Mechatronics V18MET30 - Gas Dynamics and Jet Propulsion	3	0	0	3
3	ELECTIVE-4	V18MET31 – Process Planning & Cost Estimation V18MET32 - Non Destructive Evaluation V18MET33 - Industrial Hydraulics and Pneumatics	3	0	0	3
4	ELECTIVE-5	V18MET34 - Computational Fluid Dynamics V18MET35 - Production Planning and Control V18MET36 - Energy Conservation and Management	3	0	0	3
5	V18MEL15	Project Work –PART-B	0	0	18	9
			12	0	18	21

Contact hours: 30

<p><u>Open Elective –I</u></p> <p>V18MET37- Internal Combustion Engines V18MET38- Nanotechnology</p>	<p><u>Open Elective –III</u></p> <p>V18MET41- Unconventional Machining Process V18MET42- Computer Aided Design V18MET44- Condition Monitoring& Machine learning V18MET45- Entrepreneurship</p>
<p><u>Open Elective –II</u></p> <p>V18MET39- Basic Mechanical Engineering V18MET40- Green Engineering Systems</p>	<p><u>Open Elective –IV</u></p> <p>V18MET43- Power Plant Engineering V18MBET54- Principles of Management</p>



ANNEXURE - II

SRI VASAVI ENGINEERING COLLEGE (AUTONOMOUS)

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Pedatadepalli, TADEPALLIGUDEM-534 101.W.G.Dist. (A.P)

Department of Basic Sciences & Humanities

Date: 22/04/2019

Professional Communication Skills - I

B.Tech III Semester

(Common to all Branches)

S.No	Course Code	Course Name	L	T	P	C
1	V18ENT03	Professional Communication Skills - I	3	-	-	MNC

Professional Communication Skills – II

B.Tech IV Semester

(Common to all Branches)

S.No	Course Code	Course Name	L	T	P	C
1	V18ENT04	Professional Communication Skills - II	3	-	-	MNC

Constitution of India

Year/Sem	ECE (III Sem) , CSE & ME (IV Sem)	L	T	P	C	Course Code
Regulation Year	2019-2020	2	-	-	MNC *	V18ENT11
Name of the Course	Constitution of India					
Branches	ECE, CSE & ME					



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Syllabus for the Regulation Year 2019-2020 (Common to all Branches)

Professional Communication Skills - I B.Tech III Semester

S.No	Course Code	Course Name	L	T	P	C
1	V18ENT03	Professional Communication Skills - I	3	-	-	MNC

Students will be able to

CO1: Summarize one's introduction in an appropriate manner, exhibit grammatical competence through correction of sentences, analyze noun and pronoun dispositions and develop pre-reading strategies to improve comprehension skills.[K5]

CO2: Distinguish singular and plural in different contexts and display knowledge through accurate usage of sentences, build conversations which befit the situations, comprehend the passages well and, use different kinds of idioms. [K4]

CO3: Classify various kinds of adjectives and adverbs, learn natural occurrence of paired words of native speakers, infer the referential and inferential aspects of the passages and make use of idioms while narrating personal experiences. [K4]

CO 4: Judge and assess the behaviour of people in day to day life using kinesics and proxemics that disclose their disposition and be aware of their personal traits that promote good relations. (K2)

CO5: Articulate their goals and have a constructive plan of executing them properly and become adept in oral presentations as well as poster presentations that enhance their professional skills. (K3)

CO6: Evaluate various happenings by thinking out of the box and display their latent talent. They can also reduce the stress levels by applying various stress management techniques. (K4)

Syllabus

UNIT - I

SELF-INTRODUCTION: Basic information - Academic and personal - interests- strengths and weaknesses - goal.

ERROR ANALYSIS: Nouns & Pronouns - Singular & Plural - Kinds of Nouns & Pronouns- Collective Nouns - Personal and Reflexive Pronouns.

READING COMPREHENSION: Reading as a skill - quick reading - analyzing - answering **IDIOMS & PHRASES:** Colloquial expressions- formal and informal expressions.

UNIT - II

ERROR ANALYSIS: Concord - Subject - Verb agreement.

ROLE PLAY: Day to day situations - practical approach - real life experiences.

READING COMPREHENSION: Skimming - scanning - summarizing - problem solving.

IDIOMS & PHRASES: Enriching written and spoken English - use and usage.

UNIT - III

ERROR ANALYSIS: Adjectives - Adverbs - role of modifiers - place of Adjectives- Adverbs of frequency.

COLLOCATIONS: Natural combination of words - closely affiliated with each other.

READING COMPREHENSION: At a glance - close reading - understanding - answering

IDIOMS & PHRASES: Communicative - expressive - competent.

UNIT -IV

INTER AND INTRA PERSONAL SKILLS: Leading, Coaching, Interviewing, Managing, Persuading - Self awareness, Self confidence, Good Attitude.

BODY LANGUAGE: Basics of proxemics and kinesics.

UNIT -V

PRESENTATION SKILLS: Importance of Presentation skills, Structuring our presentations, Ways to improve our presentation skills, Tips for effective presentations.- oral - Power point - poster.

GOAL SETTING: Short-term - long-term - aim - target - vision - How to set SMART goals.

UNIT - VI

LATERAL THINKING: What is creativity, Fundamental approaches to smart thinking, Characteristics of a creative person, Convergent and Divergent thinking.

STRESS MANAGEMENT: Meaning of Stress, Types of Stress, Symptoms of stress, Short term and long term stress, how can people manage stress.

References:

1. Essential English Grammar - Raymond Murphy
2. Advanced English Grammar - D.S. Paul
3. Word Power Made Easy - Norman Lewis
4. English collocations in use - Michael McCarthy
5. Word Power Made Handy - ShaliniVarma
6. Barron's GRE - Barron's
7. Current English Grammar & Usage – R.P Sinha
8. Think & Grow Rich - NapoleonHill
9. Soft Skills for Everyone - Butterfield, Jeff,
10. Soft Skills - Chauhan, G.S. and Sangeeta Sharma
11. Theories of Personality - Hall, Calvin S
12. Corporate Conversations - Holtz, Shel
13. Communication Skills - Kumar, Sanajy and PushpLata
14. Winning at Interviews - Thorpe, Edgar and Showick Thorpe
15. Swami Vivekananda and "Personality Development" published by RK Math.

S.No	Course Code	Course Name	L	T	P	C
1	V18ENT04	Professional Communication Skills - II	3	-	-	MNC

The students will be able to

C01: Correlate individual words into one whole sentence using new vocabulary and focus on the error analysis of prepositions and conjunctions. [K4]

C02: Distinguish and acquire knowledge of using words of same category in a sentence and learn new words that promote communicative finesse. [K5]

C03: Find errors in sentences where the modifiers are misplaced and put them at the appropriate place, use hit pair words and send an email that is concise and lucid[K5]

CO 4: Interpret the importance of Attire and Etiquette in societal context and manage their time. (K2)

C05: Discover the team working abilities among themselves and display their leadership qualities. (K3)

C06: Identify various elements of emotional balance that have positive impact on work-life-balance. (K2)

Syllabus

UNIT - I

ERROR ANALYSIS: Prepositions - kinds of prepositions -appropriate use - conjunctions -subordinating- co-ordinating.

VOCABULARY: Etymology - roots - suffixes - prefixes and one word substitutes.

SENTENCE IMPROVEMENT: Better choice - error-free sentences - effective - syntax.

UNIT - II

ERROR ANALYSIS: Parallel grammatical forms - same grammatical structures.

VOCABULARY: Words that describe personalities - faiths - professions - medical specialists and Word Clusters.

EXPANSION OF PROVERBS: Meaning - interpretation - explanation.

UNIT - III

ERROR ANALYSIS: Dangling modifiers - misplacement of modifiers - arrangement.

VOCABULARY: Antonyms and Synonyms and Foreign expressions.

EMAIL WRITING: Format - method of exchanging - technicalities.

UNIT- IV

ATTIRE & ETIQUETTE: Formal - informal- professional - social Attires, Meaning of Etiquette, Need for etiquette, Types of Etiquette.

TIME - MANAGEMENT: Value of time - Setting priorities - effective use of time - ABCD analysis, Pareto Principle, Eisenhower Method.

UNIT -V

TEAM WORK - Benefits of working with a team - Team Dynamics .

LEADERSHIP QUALITIES: Leadership Styles, Characteristics of a Good Leader, Big 5 Personality traits, Myths about leadership qualities.

UNIT -VI

EMOTIONAL INTELLIGENCE: What is EI - Daniel Goleman model of EI, Qualities of an Emotionally Intelligent Person - Emotional balance - feelings - thoughts - motivation.

WORK - LIFE - BALANCE: Personal life - professional life - cause of work-life imbalances, consequences of work-life imbalance, Role of gender and family - improving work life balance

References:

1. Essential English Grammar - Raymond Murphy
2. Advanced English Grammar - D.S. Paul
3. Word Power Made Easy - Norman Lewis
4. English collocations in use - Michael McCarthy
5. Word Power Made Handy - ShaliniVarma
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Syllabus for the Regulation Year 2019-2020

Constitution of India

B.Tech ECE (III Sem), CSE & ME (IV Sem)

S.No	Course Code	Course Name	L	T	P	C
1	V18ENT11	Constitution of India	2	-	-	MNC

Students will be able to

C01: Summarize the evolution and historical importance of Indian constitution from 1858 to 1947. [K2]

C02: Explain various stages in the composition of Indian Constitution. [K2]

C03: Develop awareness about their primary rights and duties & build up their civic sense. [K3]

C04: Comprehend the distribution of powers between the center and states. (K4)

C05: Summarize and sketch the specific roles of heads of Nation and the functioning of legislative bodies. (K2)

C06: Explain the role of local self-government in strengthening democracy. (K1)

Syllabus

Unit-I

Historical Perspective of the Indian Constitution – A brief discussion of various Acts i.e from 1858 to 1947 passed by the British Government.

Unit-II

Constitution of India

- Preparation of Indian constitution by Constituent Assembly of India.
- Preamble or Philosophy of the Indian Constitution.
- Salient features of the Indian constitution.

Unit-III

- a) Fundamental Rights - their importance & Limitations
- b) Fundamental Duties and their importance
- c) Directive principles of the state policy and their implementation

Unit-IV

Indian Federalism

- a) Distribution of powers between Union and State Governments
- b) Legislative, Executive and Financial relations between Union and State Governments

Unit-V

Parliamentary form of Government in India

1. Union Executive

- a) President of India- Powers and functions
- b) Vice-President - Powers and functions
- c) Prime Minister and Council of Minister - Powers and functions

1. Union Legislature

- a) Rajya Sabha – Powers and Functions
- b) Lok Sabha- Powers and Functions
- c) Amending Procedure- Important Constitutional Amendments – 42nd, 44 Constitutional Amendment Acts.

2. Judiciary – Supreme court of India - Powers and Functions

Unit-VI

Local Self-government in India 73rd & 74th Constitutional Amendments Acts

Reference Books:

1. D DBasu-Introduction to the constitution of India – 18th Edition. Prentice – Hall of India Private Ltd-New Delhi-1998
2. Granville Austin (1972) the Indian Constitution, Cornerstone of a Nation Oxford university Press, New Delhi
3. Madhavkhosla (2012) the Indian Constitution, oxford university press, New Delhi
4. Granville Austin (1999) Working a Democratic Constitution; A History of the Indian Experience, Oxford University Press, New Delhi
5. Zoya Hasan, Sridharan E and Sudharshan R (Eds) 2002 India's living Constitution, Permanent black, New Delhi
6. Baxi Upendra (1980) the Indian Supreme Court and Politics Eastern book co, Lucknow

ANNEXURE-III

V18MET04	THERMODYNAMICS	L	T	P	C
		3	1	0	4

Course Outcomes:

	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Describe the basic terms related to work and heat	K2
CO2	Explain first law of thermodynamics and internal energy.	K2
CO3	Apply the second law of thermodynamics to basic thermal systems.	K3
CO4	Explain the concept of entropy.	K2
CO5	Illustrate various thermodynamic cycles.	K2
CO6	Discuss about pure substance.	K2

UNIT – I

Thermodynamic System, boundary, Surrounding, control volume, Universe, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Cycle – Reversibility – Quasi – static Process, Irreversible Process, Causes of Irreversibility – Energy in State Work and Heat, Point and Path function. Zeroth law of thermodynamics.

UNIT – II

First law of thermodynamics: Joule’s experiments-First law of thermodynamics- systems and steady flow systems- Specific heats at constant volume and pressure - Enthalpy- First law applied to flow systems- Systems undergoing a cycle and change of state- First law applied to steady flow processes-various non-flow processes- Properties of end states- Heat transfer and work transfer- Change in internal energy-throttling and free expansion.

UNIT – III

Second law of thermodynamics-Limitations of the First Law – Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot’s principle, Carnot cycle and its specialties, Clausius theorem Clausius Inequality.

UNIT – IV

Entropy, Principle of Entropy Increase, availability and irreversibility–Third Law of Thermodynamics
T-ds relations, Helmholtz and Gibbs functions, Gibbs relations, Maxwell relations

UNIT – V

Thermodynamic Cycles: Carnot vapor cycle, ideal Rankine cycle, Rankine reheat cycle, air-standard Otto cycle, air-standard Diesel cycle, air-standard Brayton cycle, vapor-compression refrigeration cycle.

UNIT – VI

Pure Substances: P-V-T- surfaces, T-S and h-s diagrams, Mollier Charts, Phase Transformations, Triple point at critical state properties during change of phase, Dryness Fraction.

Text Books:

1. Engineering Thermodynamics, PK Nag 5thEdn, TMH,2014
2. Thermodynamics. An engineering Approach with student resources DVD Y.A. Cengel& M.A. Boles, 7th Edn-McGrawHill,2014
3. Internal Combustion Engine –V Ganeshan.4th edition, TMH, 2016

References:

1. Engineering Thermodynamics by Y.V.C. Rao, 1st edition, Universities, 2005.
2. A text book of Engineering thermodynamics, R.K Rajput, 4th edition, Lakshmi Publishers,2010

V18MET05	FLUID MECHANICS AND FLUID MACHINES	L	T	P	C
		3	0	0	3

	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Understand the basic concepts of fluid properties and to determine hydrodynamic forces on submerged bodies.	K3
CO2	Apply the flow field phenomena and the basic governing equations in solving fluid flow problems.	K3
CO3	Calculate the various losses occurring when the fluid flowing in closed conduit and measure the discharge by different apparatus.	K3
CO4	Understand the concept of boundary layer theory and to find out major and minor losses.	K3
CO5	Determine the forces in the operation of jets and turbines and to determine efficiencies of turbines.	K3
CO6	Interpret the operation of pumps and hydraulic systems and to find efficiencies of pumps.	K3

UNIT 1

Fluid Statics :Dimensions and units-Physical properties of fluids-Density, Specific gravity, Viscosity, Surface tension, Vapour pressure, Capillarity, Bulk modulus. Pressure types-Atmospheric, absolute, gauge and vacuum pressure. Measurement of pressure - Piezometer, different types of manometers.

UNIT 2

Fluid Kinematics: stream line, path line and streak line. Classification of flows- steady & unsteady, uniform & non uniform, laminar & turbulent, rotational & irrotational flows-equation of continuity for one dimensional flow and three dimensional flow. Equation of continuity in differential form.

UNIT 3

Fluid Dynamics: Bernoulli's equation along a stream line, Momentum equation, application of momentum equation on pipe bend. Measurement of flow- Pitot tube, Venturimeter, Orifice meter, Turbine flow meter.

UNIT 4

Closed Conduit Flow: Reynolds experiments, Darcy-Weisbach equation, Major and minor losses, Hydraulic gradient line, Total energy line, Pipes in series and parallel.

Boundary layer concepts: Definition, Development along a thin flat plate, Thicknesses (Momentum, Energy, Displacement-No derivations), separation, methods of controlling separation, stream lined and bluff bodies.

UNIT 5

Basics of turbomachinery: Determination of hydrodynamic force of jet on stationary and moving flat, inclined, curved vanes (jet striking at tip and centre), velocity diagrams, work done and efficiency, flow over radial vanes, series of vanes.

Turbines:

Classification of turbines, Pelton wheel, Francis turbine, Kaplan turbine- Working principles, working proportions, work done, efficiencies. Draft tube-types, functions and efficiency. Unit and specific quantities, governing, Cavitation, Water hammer, Surge tank.

UNIT 6:

Pumps :

Centrifugal pumps: Classification, working, work done, heads, efficiencies, losses. Specific speed, pumps in series and parallel.

Reciprocating pumps: Classification, working, work done, slip, indicator diagrams, Effect of acceleration and friction on work done.

TEXT BOOKS:

1. Hydraulics And Fluid Mechanics Including Hydraulics Machines (In Si Units)– Modi& Seth,20th edition, Standard publishers, 2015.
2. Fluid mechanics and Hydraulic machines – R.K. Bansal,1st edition, Lakshmi Publications,2011

REFERENCES:

1. Fluid Mechanics And Fluid Power Engineering, D.S Kumar, 9th edition, , S.K Kataria publishers, 2016
2. Fluid Mechanics and Hydraulics by Jack.B. Evett –,3rd edition, TMH, 2004
3. Fluid Mechanics – YunusA.Cengel& John.M.Cimbala,2nd edition, TMH publications, 2013

V18MET09	MATERIALS ENGINEERING	L	T	P	C
		3	0	0	3

	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Explain the types of bonds in solids and crystallization of metals.	K2
CO2	Construct phase diagrams for the study of alloys and phase transformation reactions.	K2
CO3	Distinguish Cast Irons and Steels.	K2
CO4	Identify suitable heat treatment process to achieve desired properties of metals and alloys.	K2
CO5	Discriminate different non ferrous metals and their alloys	K2
CO6	Illustrate the properties and applications of composites and ceramic materials and understand the concepts of powder metallurgy.	K2

Unit 1

Structure of Metals: Properties of metals, Types of Bonds in Solids, Crystal geometry - Space Lattices, Unit cells, Crystal Structure, Miller indices. Imperfections in crystals- Line defects, Point defects, Surface defects. Crystallization of metals, grain, grain boundaries and their properties.

Constitution of alloys: Necessity of alloying, types of solid solutions, Hume Rotherys rules.

Unit 2

Equilibrium Diagrams: Experimental methods of construction of equilibrium diagrams, phase rule, Isomorphous alloy systems, Lever rule, eutectic systems, peritectic reaction. Transformations in the solid state – allotropy, eutectoid, peritectoid reactions, relationship between equilibrium diagrams and properties of alloys. Study of important binary phase diagrams of Cu-Ni, Al-si, and Fe-Fe₃C.

Unit 3

Production of Iron & Steels: Working principle of Blast Furnace, Cupola furnace, Open hearth furnace, Electric arc furnace and Induction furnace.

Cast irons and alloy steels: Types of Cast irons- White, Grey, Malleable and Nodular Cast Irons, Properties and application of cast irons, Effect of alloying elements on structure and properties of steels, Properties and uses of Silicon and Hadfield Manganese steels, High speed steels and Stainless steel.

Unit 4

Heat treatment of Ferrous and Non Ferrous alloys: Types of heat treatment processes, Annealing, normalizing, hardening, TTT diagrams, tempering, hardenability, surface - hardening methods, Age hardening treatment.

Unit 5

Non-ferrous metals and alloys: Properties and uses of important non-ferrous metals like Cu, Al, Pb, Sn, Zn. Study of important non-ferrous alloys: Brass & Bronzes, Bearing alloys, Al alloys & Ti alloys.

Unit 6

Composite materials and Ceramics: Classification of composites, methods of manufacturing of composites – stir casting method, hand layup process, filament winding process.

Properties and applications of crystalline ceramics, glasses, cermets, abrasive materials and nano-materials

Powder metallurgy: Introduction, steps in powder metallurgy.

TEXT BOOKS:

1. Introduction to Physical Metallurgy/ Sidney H. Avner/ 2nd edition, McGraw Hill Education (India) Private Limited/2016
2. Materials Science and Engineering/ William D Callister (Adapted by R. Balasubramaniam) /Wiley India (P) Ltd/ 2007
3. Material Science and Metallurgy/ Dr. V.D.Kodgire/40th edition, Everest Publishing House/2017

REFERENCE BOOKS:

1. Materials Science and Engineering/ V. Raghavan/(5th Edition) Prentice-Hall of India Pvt. Ltd/2004.
2. Essential of Materials science and engineering /Donald R.Askeland/ 2nd edition Thomson/2014
3. Engineering mechanics of Composite Materials/Isaac M.Daniel, Ori Ishai/ 5th edition/Oxford Publications/2015.

V18MEL02	MACHINE DRAWING	L	T	P	C
		0	0	3	1.5

Course Outcomes:

	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Describe the drawing and develop ability to represent any matter/symbol with the help of picture in CAD.	K2
CO2	Develop primary knowledge on machine drawings and the representation of tolerance on dimensions.	K3
CO3	Show the hidden objects by sectional views of different machine parts and their geometry representation.	K3
CO4	Identify the different joining methods to assemble the machine parts .	K3
CO5	Develop skill to produce assembly drawings from detailed drawings of machines parts.	K3
CO6	Construct press tools and their assemblies in 3-D.	K3

PART-A

Sectional views :Orthographic projection of different types of composite bodies. Sectional views, Full sectional, half sectional views of simple machine parts, Screwed fastenings – nomenclature of threads, conventional representation of threads, Hexagonal and square headed bolts and nuts, Various types of machine screws and set screws, Foundation bolts.

Keys, Shaft couplings, Riveted joints, Bearings

Sunk key, saddle key, feather key, sleeve coupling, flanged coupling, lap and butt riveted joints and plummerblock, Lock nuts, Cotter joints

PART-B

AutoCAD Mechanical Desktop, draw, modify, dimension tool bars, annotations, Layers, ISI conventions in drawing, representation of Materials, machine parts, welded joints, riveted joints, methods of indicating notes on drawings. Sketcher, part modeling, assembly, drafting commands in CATIA.

Assembly drawings in 2D using AUTOCAD: **Stuffing box, steam engine connecting rod, Eccentric, single tool post, Lathe tail stock, machine vice, knuckle joint and Screw jack.**

Assembly drawings in 3D Using CATIA: Foot step bearing, square tool post, piercing and blanking tool, V-bending tool and box jig.

TEXT BOOKS:

1. Machine drawing _ K.L. Narayana, P. Kannaiah&K.Venkatareddy, 1st edition, Radiant, 2016
2. Tool Engineering & Design _ G.R. Nagpal/Khanna publishers, 1st edition, Khanna Publishers,2009
3. Machine Drawing with Auto CAD- Pohit and Ghosh,1st edition, Pearso, 2017

REFERENCES:

1. Machine Drawing by Nagpal,1st edition, khanna publishers, 2009
2. Machine drawing, Ajeet Singh, 2nd edition, TMH, 2016
3. Machine drawing with autocad, Pohit; Goutam, 1st edition, Pearson, 2017.

V18MEL03	FLUID MECHANICS AND FLUID MACHINES LAB	L	T	P	C
		0	0	3	1.5

Course Outcomes:

	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Employ the basic principles of Fluid mechanics to assess discharge with different devices and different losses in a pipe line.	K3
CO2	Calculate the performance parameters of Reciprocating and Centrifugal pumps.	K3
CO3	Calculate the performance parameters of different types of turbines.	K3

1. Determination of friction factor for the given pipe line.
2. Determination of loss of head due to sudden contraction.
3. Determination of force exerted by a jet on a vane.
4. Calibration of Venturimeter.
5. Calibration of Orificemeter.
6. Calibration of Turbine flow meter.
7. Determination of performance parameters of Reciprocating pump.
8. Determination of performance parameters of Single stage Centrifugal pump.
9. Determination of performance parameters of Multi stage Centrifugal pump.
10. Determination of performance parameters of Pelton wheel.
11. Determination of performance parameters of Francis Turbine.
12. Determination of performance parameters of Kaplan Turbine.

ADD ON EXPERIMENTS:

1. Determination of loss of head due to sudden expansion.
2. Verification of Bernoulli's theorem.

REFERENCES:

1. Fluid Mechanics and Fluid Machines lab – College lab manual.
2. Hydraulics, Fluid Mechanics and Hydraulic Machinery – Modi & Seth.

V18MET07	APPLIED THERMODYNAMICS	L	T	P	C
		3	0	0	3

Course Outcomes:

	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Illustrate the working of various IC engines.	K2
CO2	Classify the working of various steam boilers, mountings, accessories and draught systems.	K2
CO3	Demonstrate about steam nozzles	K2
CO4	Calculate the performance of steam turbines	K3
CO5	compute the performance of steam condensers	K3
CO6	Illustrate the performance parameters of gas turbines	K3

UNIT – I

I. C. ENGINES : Classification, Working principles, Valve and Port Timing Diagrams, Engine systems, Fuel, Carburettor, Fuel Injection System, Ignition, Cooling and Lubrication, principle of wankle engine.

UNIT – II

Steam boilers

Classification, working principles of L.P & H.P boilers with sketches & applications, mountings and accessories, working principles, boiler horse power, Process Steam, equivalent evaporation, efficiency and heat balance, draught, classification- natural and artificial draught.

UNIT – III

Steam Nozzles:

Type of nozzles- Applications - Flow through nozzles- Condition for maximum discharge- Nozzle Efficiency- Super saturated flow in nozzles, Wilson's line.

UNIT – IV

Steam Turbines: Classification, Applications, impulse turbine, mechanical details, velocity diagram, effect of friction, power developed, axial thrust, blade or diagram efficiency, condition for maximum efficiency, velocity compounding, pressure compounding and velocity & pressure Compounding, combined velocity diagram for a velocity compounded impulse turbine.

Reaction Turbine: Applications , Mechanical details, principle of operation, thermodynamic analysis of a stage, degree of reaction, velocity diagram, Parson's reaction turbine, condition for maximum efficiency.

UNIT – V

Steam Condensers:

Classification of condensers- Jet, Evaporative and surface condensers-Applications - Vacuum and its Measurement- Vacuum efficiency- Sources of air leakage in condensers- Condenser Efficiency- Daltons law of partial pressures- Determination of mass of cooling water.

UNIT – VI

Gas Turbines: Applications, Simple gas turbine plant, ideal cycle, essential components, parameters of performance, actual cycle, regeneration, inter cooling and reheating, closed and open cycles, merits and demerits.

Text Books:

1. Engineering Thermodynamics, PK Nag 4thEdn, TMH.
2. Thermodynamics. An engineering Approach with student resources/ DVD. Y.A. Cengel& M.A. Boles/ 8thEdn-McGrawHill/2016
3. Gas Turbines / V Ganesan/3rd edition, TMH/2016

References:

1. Thermal Engineering/ R.K.Rajput/4th edition/Laxmi Publications/2010
2. Applied Thermodynamics-II / R. Yadav./6th edition, Central Publishing House/2016
3. Gas turbines and Propulsive Systems/1st edition,DhanpatRai/2014
4. Tables of the properties of steam and other vapours and temperature-Entropy table by Cecil H Peabody by Forgotten books
5. Steam tables by C.P Kodandaraman – New age International

V18MET08	MECHANICS OF SOLIDS	L	T	P	C
		3	1	0	4

	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Explain concept of stress and strain of composite bars.	K2
CO2	Find the shear force and bending moment in a beams.	K3
CO3	Calculate flexural and shear stresses in a beam and understand applications of various springs.	K3
CO4	Estimate the principal stresses in structural members.	K3
CO5	Determine the torsional rigidity of shaft and buckling load capacity of columns.	K3
CO6	Estimate the hoop and longitudinal stress and strains in thin and thick cylinders.	K3

UNIT-I Simple stresses & Strains:

Definitions of stress and strain – types of stresses and strains – Elasticity – Hooke’s law – Stress – Strain diagram for Mild steel – working stress- factor of safety- Lateral strain – Poisson’s ratio and volumetric strain – Elastic Moduli and the relationship between elastic constants – Bars of varying section – composite bars – temperature stresses.

Strain Energy

Definition – Resilience – Strain Energy due to gradually applied; suddenly applied and impact loads – simple applications.

UNIT-II Shear Force & Bending Moment Diagrams:

Definition of beam – Types of beams – concept of SF and BM – SF & BM diagrams for cantilever, Simple support and overhanging beams subjected point loads, Uniform distributed load(UDL), Uniformly varying loads– point of contra flexure – Relationship between S.F, BM and rate of loading.

UNIT-III Flexural Stresses:

Theory of simple Bending – Assumptions–Derivation of Bending equation - Neutral axis – Determination of bending stresses – section modulus of rectangular, Circular sections (Solid and Hollow), I and T channel sections.

Mechanical Springs: Introduction , classification , Applications , Stresses and deflections of helical springs – extension -compression springs .

UNIT-IV Principal Stresses and Strains:

Introduction-stresses on an inclined section of a bar under axial loading- compound stresses-Normal and tangential stresses on an inclined plane for biaxial stresses-Two perpendicular normal stresses –representation of stress on Mohr's circle diagram, Introduction to theories of Failure.

UNIT-V

TORSION: Introduction- Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts, torsional rigidity. Combined torsion and bending of circular shafts.

COLUMNS: Buckling and Stability, Columns with Pinned ends, Columns with other support Conditions, Limitations of Euler's Formula, Rankine's Formula.

UNIT-VI

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 – Riveted boiler shells – Thin spherical shells.

THICK CYLINDERS: –lame's equation – cylinders subjected to inside & outside pressures –compound cylinders.

Text Books:

1. Solid Mechanics, by Popov/PHI publications 2nd edition /2017
2. Mechanics of Materials/Gere and Timoshenko,/ TMH 4th edition /2010
3. Strength of materials/ S.Ramamrutham/Dhanpatrai publishers 1st edition /2016

Reference Books:

1. Strength of materials/ R.K.Bansal/ Laxmi Publications 5th edition /2017
2. Introduction to Solid Mechanics / Irving H Shames/ 4th edition PEARSON /2014
3. Strength of materials /Young,D.H. Timoshenko, Stephen/CBS publishers /2002

V18MET06	THEORY OF MACHINES-I	L	T	P	C
		3	0	0	3

Course Outcomes:

	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Explain the inversion of the four bar, slider crank and double slider chains.	K2
CO2	Determine the velocities and accelerations in mechanisms by graphical method.	K3
CO3	Explain the working of copying mechanism, straight line motion mechanisms, steering gears and Hooke's joint.	K2
CO4	Draw the cam profiles for given follower motions.	K3
CO5	Compare tooth profiles for gears and compute performance characteristics.	K2
CO6	Describe gear trains and compute the velocity ratio and torque in gear trains and calculate various parameters related to belts.	K3

UNIT-I

Mechanisms :

Introduction, terminology, definitions and assumptions, planar, spherical and spatial mechanisms, mobility, classification of mechanisms, kinematic inversion, inversions of four bar chain, slider crank chain and double slider chain, Grashoff's law, mechanical advantage.

UNIT-II

Velocity Analysis :

Introduction, Absolute and relative motions, Vectors, Addition and subtraction of vectors, Motion of a link, Four-link mechanism, Velocity diagrams, Angular velocity of links, Velocity of rubbing, Slider-crank mechanism, crank and slotted lever mechanism. Instantaneous center, Kennedy's theorem, Locating I-centers, Angular velocity ratio theorem.

Acceleration Analysis:

Introduction -Acceleration, four-link mechanism, Acceleration of intermediate and offset points, Slider-crank mechanism, Coriolis component, Crank and slotted lever mechanism using graphical method, Klein's Construction.

UNIT-III

Lower Pairs: Pantograph, Exact straight line mechanism condition, Peaucellier, Hart Scott-Russel mechanisms. Approximate straight line mechanisms, Grasshopper, Watt, Chebyshev, Robert mechanisms. Steering gears-condition for correct steering, Davis, Ackerman steering gears, Hooke's joint-velocity ratio, angular acceleration of driven shaft, double Hooke's joint.

UNIT-IV

Cams: Types of cams and followers, types of follower motion, velocity and acceleration diagrams, profile of cams.

UNIT-V

Gears: Classification of gears, spur gears- terminology, fundamental law of toothed gearing, involute and cycloidal profile, Path of contact, arc of contact, contact ratio, minimum number of teeth, interference and methods of avoiding interference, rubbing velocity.

UNIT-VI

Gear Trains: Introduction – Types – Simple – compound and reverted gear trains – Epicyclic gear train.

Belt drives: Belt and rope drives, open and crossed belt drives, velocity ratio, slip, material for belts and ropes, crowning of pulleys, ratio of friction tensions, power transmitted, centrifugal effect on belts, maximum power transmitted by a belt, initial tension.

Text Books:

1. Theory of Machines' Rattan SS, Tata McGraw Hill Education Publishers, 4th Edition 2015.
2. Theory of Machines / BevenThomos / CBS publication, 3rd edition /2005

References:

1. Theory of Machines / R.K.Bansal/ Laxmi Publications 5th edition /2016
2. Mechanisms of Machines, V Ramamurthy, Narosa publishing House, Reprint ,2019
3. Theory of Machines by R S KHURMI, S CHAND Publications, 1st Edition, 2011.
4. Theory of Machines and Mechanisms, Ballaney P, Khanna publications, 1st Edition, 2011.

V18MET14	MANUFACTURING PROCESSES	L	T	P	C
		3	0	0	3

Course Outcomes:

After successful completion of the course, the student will be able to

V18MET03	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Understand fundamentals of casting-patterns and its materials, Gating System	3
CO2	Choose the elements of casting and introduce other casting processes	3
CO3	Distinguish various arc and solid state welding processes and select a suitable process based on the application and requirements	3
CO4	Understand the principles of advanced welding processes and their applications, welding defects and its testing methods	3
CO5	Establish the knowledge on Hot working and Cold Working Process	3
CO6	Understanding of various bulk forming processes, sheet metal forming and processing of plastics.	3

Unit I:

Casting - Steps involved in making a casting – Advantage of casting and its applications.

Patterns and Pattern making – Types of patterns – Materials used for patterns, pattern allowances and their construction

Principles of Gating – Gating ratio and design of Gating systems

Unit II:

Melting and solidification:

Methods of melting -- Crucible melting and cupola operation, steel making processes.

Solidification of casting – Concept – Solidification of pure metal and alloys, short & long freezing range alloys.

Risers – Types function and design, casting design considerations,

Special casting processes -- 1) Centrifugal 2) Die 3) Investment.

Unit III:

Welding: Classification of welding process types of welds and welded joints and their characteristics, design of welded joints --Gas welding, ARC welding, Forge welding, resistance welding, Thermit welding and Plasma (Air and water) welding.

Unit IV:

Special welding processes

Inert Gas welding - TIG & MIG, welding, Friction welding, Induction welding, Explosive welding, Laser welding, Soldering & Brazing. Heat affected zones in welding; welding defects – causes and remedies – destructive non-destructive testing of welds.

Cutting of metals: Oxy – Acetylene Gas cutting, water plasma. Cutting of ferrous, non-ferrous metals.

Unit V:

Hot & cold working: strain hardening, recovery, recrystallization and grain growth, Comparison of properties of Cold and Hot worked parts

Rolling fundamentals – Theory of rolling, types of Rolling mills and products.

Extrusion of metals: Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion Hydrostatic extrusion.

Drawing – Wire drawing and Tube drawing

Unit VI:

Bulk forming processes: Principles of forging – Tools and dies – Types Forging – Smith forging, Drop Forging – Roll forging – Forging hammers: Rotary forging – forging defects.

Sheet metal forming: Stretch Forming, Deep Drawing, Coining, Spinning, Blanking And Piercing – Bending And Forming, Stamping Spring Back And Remedies - Types Of Presses And Press Tools

Processing of plastics: Types of Plastics, Properties, applications and their Processing methods & Equipment (blow & injection moulding)

Text Books:

1. Manufacturing Engineering and Technology/Kalpakjian, Serope;Steven, Schmid R. / Pearson,1stEdition 2013.
2. Manufacturing Technology / P.N. Rao/Tata McGraw Hill,4th Edition 2016.

References:

1. Production Technology / R.K. Jain /Khanna publishers,17th edition 2004.
2. Principles of Metal Castings / Richard W Heine and Roenthal.McGraw Hill Education, 2nd Edition2017.
3. Welding Process and technology /Dr. Paramar / Khanna Publishers,3rd Edition.
4. Production Technology /Sarma P C / S.Chand Publications,4th Edition 2014.

V18MET11	INSTRUMENTATION AND CONTROL SYSTEMS	L	T	P	C
		3	0	0	3

Course Outcomes:

	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Discuss about the basic concepts of Linear measuring Instruments	K2
CO2	Explain various types of Temperature and Pressure measuring Instruments	K2
CO3	Understand the working of flow, Speed, Acceleration and Vibration measuring devices	K2
CO4	Illustrate various types of Strain measuring Instruments	K2
CO5	Explain the Humidity, Force, Torque, and Power measuring Instruments	K2
CO6	Describe various types of control system and its Elements	K2

UNIT – I

Basic principles of measurement – Generalized configuration, Dynamic performance characteristics – sources of error and elimination methods.

Displacement Measurement: Principle and construction of various transducers – piezo electric, inductive, capacitance, resistance, ionization and photo electric transducers, calibration procedures.

UNIT – II

Temperature Measurement : Thermometry , scales of temperature, electrical resistance – thermister – thermocouple – pyrometers.

Pressure Measurement : Working of Various instruments - dead weight pressure gauge , bourdon pressure gauges, bellows – diaphragm gauges.

Low pressure measurement – Thermal conductivity gauges – Ionization pressure gauges, Mcleod pressure gauge.

UNIT – III

Level Measurement : Working of Various instruments – Capacitative, Ultrasonic, Magnetic, Cryogenic fuel level indicators – bubbler level indicators.

Flow Measurement-Rotameter, Magnetic, Ultrasonic, hot – wire anemometer, Laser Doppler Anemometer (LDA).

Speed Measurement : Types of Mechanical tachometers, electrical tachometers, stroboscope and noncontact type of tachometer

UNIT – IV

Acceleration And Vibration Measurement: Principles of seismic instruments – Vibrometer and Accelerometer

Strain Measurements: Various types of strain measuring instruments – electrical strain gauge – gauge factor – use of resistance strain gauge for measuring bending compressive and tensile strains , strain gauge rosettes.

UNIT – V

Introduction to Elements Of Control Systems : classification, Elements of control systems, concept of open loop and closed loop systems, Examples and application of open loop and closed loop systems, Feed-Back Characteristics.

UNIT – VI

Control Systems Components: Servomechanisms- Transfer Function of DC Servo motor and AC Servo motor, working principle of stepper motor, applications (position, temperature and speed control systems with block diagrams).

Microprocessor and Microcontrollers : Introction, basic concepts and various types controllers

Text Books:

1. Measurement Systems: Applications & design / D.S Kumar/ Metropolitan/1st/2015
2. Mechanical Measurements / BeckWith, Marangoni, Linehard/ Pearson/6th/2018

References:

1. Measurement systems: Application and design/Doebelin Earnest. O. Adaptation/ TMH/ 6th edition, 2018
2. A course in mechanical measurements and Instrumentation and control/ Sawhney, A.K.;Sawhney, Puneet/ DhanpatRai/1st edition/2016
3. Experimental Methods for Engineers / J.P.Holman/McGraw Hill /8th edition.
4. Mechanical and Industrial Measurements / R.K. Jain/ Khanna Publishers/2008

V18MEL05	Mechanics of Solids & Materials Engineering Lab	L	T	P	C
		0	0	3	1.5

	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Assess the Mechanical properties of different metals.	K3
CO2	Examine the microstructures of different ferrous and non ferrous metals.	K3
CO3	Identify the effect of heat treatment and cooling rates on the properties of steels.	K4

NOTE: Any 6 experiments from each section A and B.

(A) MECHANICS OF SOLIDS LAB:

1. Direct tension test
2. Bending test on
 - a) Simply supported beam
 - b) Cantilever beam
3. Torsion test
4. Hardness test
 - a) Brinells hardness test
 - b) Rockwell hardness test
5. Test on springs
6. Compression test on cube
7. Impact test
8. Punch shear test

(B) METALLURGY LAB:

1. Preparation and study of the Micro Structure of pure metals like Iron, Cu and Al.
2. Preparation and study of the Microstructure of Mild steels, Medium carbon steels, high – C steels.
3. Study of the Micro Structures of Cast Irons.
4. Study of the Micro Structures of Non-Ferrous alloys – Brass and Bronze.
5. Study of the Micro structures of Heat treated steels.
6. Hardenability of steels by Jominy End Quench Test.
7. To find out the hardness of various treated and untreated steels.

References:

1. Strength of materials, S.S.BhavikattiVikas Publications, 4th edition, 2013.
2. Material Science and Metallurgy, Dr. V.D.Kodagire, Everest Publishing House, 40 th Edition, 2017.

V18MEL11	MANUFACTURING PROCESSES LAB	L	T	P	C
		0	0	3	1.5

Course Outcomes:

V18MET03	After successful completion of the course, the student will be able to:	Knowledge Level
CO1	Design and Make a pattern.	3
CO2	Test the properties of sand and prepare a casting.	3
CO3	Perform Arc welding, Spot welding, TIG, MIG welding and Plasma Arc Cutting operations	3
CO4	Perform blanking, piercing, Drawing and bending operations.	3
CO5	Operate injection and blow moulding machines to manufacture plastic components	3

METAL CASTING:

Pattern Design and pattern making using wood turning lathe
Sand properties testing for Compression strength and permeability.
Mould preparation, melting and casting.

WELDING:

ARC Welding Lap, Butt & T- Joint
Spot Welding –Lap &Butt Joint
TIG Welding -Butt Joint
MIG Welding- Butt Joint
Plasma Arc Cutting

METAL FORMING:

Blanking & Piercing operation by using Progressive Die
Bending and Drawing operation

PROCESSING OF PLASTICS

Injection Molding
Blow Molding

REFERENCES:

1. Production technology lab – college manual.
2. Manufacturing Engineering and Technology/Kalpajian, Serope; Steven, Schmid R. / Pearson, 1st Edition, 2013
3. Manufacturing Technology / P.N. Rao/TMH, 4th Edition, 2016.