

Walchand College of Engineering

(Government Aided Autonomous Institute)

Vishrambag, Sangli-416415



Course Content for S. Y. M. Tech. Mechanical (Heat Power Engineering)

Semester - III and IV

2023-24

D. Wastani

S. K. S.

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	M. Tech. (Heat Power Engineering)
Class, Semester	Second Year M. Tech., Sem III
Course Code	6HP645
Course Name	Dissertation Phase I
Desired Requisites:	Concept knowledge of research methodology, project management, mechanical engineering

Teaching Scheme

Examination Scheme (Marks)

Practical	6 Hrs/ Week	LA1	LA2	Lab ESE	Total
Interaction	-	100	00	00	100
Credits: 03					

Course Objectives

1	To develop the student to apply the knowledge gained to identify problems for research and provide the solutions by self-study and interaction with stakeholders.
2	Acquire knowledge to tackle real world problems of societal concerns
3	Impart flexibility to the student to have increased control over his/ her learning
4	Teachers would serve as mentor/facilitator of inquiry and reflection rather than as an instructor
5	Enhance a students' learning through increased interaction with peers and colleagues.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Search the existing literature and identification of research problem	IV	Analyzing
CO2	Design and develop the solution for complex engineering problem	V	Evaluating
CO3	Create the new knowledge in the specialized field	VI	Creating

Course Content

Students are expected to carry out independent research work on the chosen topic. In this semester it is expected that the student has carried out substantial research work including exhaustive literature survey, formulation of the research problem, development/fabrication of experimental set-up (if any/required) and testing, and analysis of initial results thus obtained. In fourth semester, the students continue their dissertation work. It is expected that the student has completed most of the experimental/computation works and analyzed the results so obtained as proposed in the synopsis. The work should be completed in all respects this semester. The students are required to submit the dissertation work in the form of report as per the institute rule

Textbooks

1	As per the research topic
---	---------------------------

References	
1	National and International Journals
Useful Links	
1	https://nptel.ac.in/courses/121/106/121106007/
2	https://www.youtube.com/watch?v=mAVswCbz_jM&feature=emb_imp_woyt
3	https://nptel.ac.in/courses/110/104/110104073/
4	https://nptel.ac.in/courses/110/107/110107081/

CO-PO Mapping						
Programme Outcomes (PO)						
	1	2	3	4	5	6
CO1	1			1		2
CO2	1		1		2	1
CO3		2				1

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%				
Assessment	Based on	Conducted by	Typical Schedule	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	M. Tech. (Heat Power Engineering)
Class, Semester	Second Year M. Tech., Sem III
Course Code	6HP646
Course Name	Dissertation Phase II
Desired Requisites:	Concept knowledge of research methodology, project management, mechanical engineering

Teaching Scheme

Examination Scheme (Marks)

Practical	6 Hrs/ Week	LA1	LA2	Lab ESE	Total
Interaction	-	00	100	00	100
Credits: 03					

Course Objectives

1	To develop the student to apply the knowledge gained to identify problems for research and provide the solutions by self-study and interaction with stakeholders.
2	Acquire knowledge to tackle real world problems of societal concerns
3	Impart flexibility to the student to have increased control over his/ her learning
4	Teachers would serve as mentor/facilitator of inquiry and reflection rather than as an instructor
5	Enhance a students' learning through increased interaction with peers and colleagues.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Search the existing literature and identification of research problem	IV	Analyzing
CO2	Design and develop the solution for complex engineering problem	V	Evaluating
CO3	Create the new knowledge in the specialized field	VI	Creating

Course Content

Students are expected to carry out independent research work on the chosen topic. In this semester it is expected that the student has carried out substantial research work including exhaustive literature survey, formulation of the research problem, development/fabrication of experimental set-up (if any/required) and testing, and analysis of initial results thus obtained. In fourth semester, the students continue their dissertation work. It is expected that the student has completed most of the experimental/computation works and analyzed the results so obtained as proposed in the synopsis. The work should be completed in all respects this semester. The students are required to submit the dissertation work in the form of report as per the institute rule

Textbooks

1	As per the research topic
---	---------------------------

References	
1	National and International Journals
Useful Links	
1	https://nptel.ac.in/courses/121/106/121106007/
2	https://www.youtube.com/watch?v=mAVswCbz_jM&feature=emb_imp_woyt
3	https://nptel.ac.in/courses/110/104/110104073/
4	https://nptel.ac.in/courses/110/107/110107081/

CO-PO Mapping						
Programme Outcomes (PO)						
	1	2	3	4	5	6
CO1	1			1		2
CO2	1		1		2	1
CO3		2				1

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%				
Assessment	Based on	Conducted by	Typical Schedule	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40
Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.				

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	M. Tech. (Heat Power Engineering)
Class, Semester	Second Year M. Tech., Sem III
Course Code	6HP647
Course Name	Dissertation Phase III
Desired Requisites:	Concept knowledge of research methodology, project management, mechanical engineering

Teaching Scheme

Examination Scheme (Marks)

Practical	8 Hrs/ Week	LA1	LA2	Lab ESE	Total
Interaction	-	00	00	100	100
Credits: 04					

Course Objectives

1	To develop the student to apply the knowledge gained to identify problems for research and provide the solutions by self-study and interaction with stakeholders.
2	Acquire knowledge to tackle real world problems of societal concerns
3	Impart flexibility to the student to have increased control over his/ her learning
4	Teachers would serve as mentor/facilitator of inquiry and reflection rather than as an instructor
5	Enhance a students' learning through increased interaction with peers and colleagues.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Search the existing literature and identification of research problem	IV	Analyzing
CO2	Design and develop the solution for complex engineering problem	V	Evaluating
CO3	Create the new knowledge in the specialized field	VI	Creating

Course Content

Students are expected to carry out independent research work on the chosen topic. In this semester it is expected that the student has carried out substantial research work including exhaustive literature survey, formulation of the research problem, development/fabrication of experimental set-up (if any/required) and testing, and analysis of initial results thus obtained. In fourth semester, the students continue their dissertation work. It is expected that the student has completed most of the experimental/computation works and analyzed the results so obtained as proposed in the synopsis. The work should be completed in all respects this semester. The students are required to submit the dissertation work in the form of report as per the institute rule

Textbooks

1	As per the research topic
---	---------------------------

References	
1	National and International Journals
Useful Links	
1	https://nptel.ac.in/courses/121/106/121106007/
2	https://www.youtube.com/watch?v=mAVswCbz_jM&feature=emb_imp_woyt
3	https://nptel.ac.in/courses/110/104/110104073/
4	https://nptel.ac.in/courses/110/107/110107081/

CO-PO Mapping						
Programme Outcomes (PO)						
	1	2	3	4	5	6
CO1	1			1		2
CO2	1		1		2	1
CO3		2				1

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%				
Assessment	Based on	Conducted by	Typical Schedule	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	M. Tech. (Heat Power Engineering)
Class, Semester	Second Year M. Tech., Sem III
Course Code	6HP611
Course Name	Design of Solar and Wind System
Desired Requisites:	Energy Engineering

Teaching Scheme		Examination Scheme (Marks)			
Lecture	3 Hrs/week	MSE	ISE	ESE	Total
Tutorial	0 Hrs/week	30	20	50	100
Credits: 3					

Course Objectives

1	Acquire knowledge to tackle real world problems of societal concerns.
2	Impart flexibility to the student to have increased control over his/ her learning.
3	Teachers would serve as mentor/facilitator of inquiry and reflection rather than as an instructor.
4	Enhance student's learning through increased interaction with peers and colleagues.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Search the existing literature and identification of research problem	III	Apply
CO2	Design and develop the solution for complex engineering problems.	IV	Analyze
CO3	Create the new knowledge in the specialized field	V	Evaluate

Module	Module Contents	Hours
I	Energy scenario, Man and energy, World's production of commercial energy sources, India's production and reserves, Energy alternatives, The solar energy option	4
II	Thermal applications, Water heating, Space heating, Space cooling and refrigeration, Power generation, Distillation, Drying and Cooking, Concentrating collector, Central receiver system	4
III	Liquid flat plate collector, Performance analysis, Collection efficiency factor, Selective surfaces, Evacuated tube collector, BNL, Polymer and concrete collector, Solar air collector, types, performance analysis, Air heater with fins,	4

IV	Thermal energy storages, Sensible and latent heat storage, Solar ponds, Performance analysis, operational problems, Other solar pond concepts, Photovoltaic conversion, Performance characteristics, Commercial solar cell, cost and applications, prospects of PV cell for India	4
V	Wind energy fundamentals and applications, Merits, Limitations, Nature and origin of wind, Wind turbine theory, Power of wind turbine for given incoming wind velocity V_i , Wind to electric energy conversion system	5
VI	Classification and development of wind machines, Multi bladed type, Propeller type, wind machines, Wind data performance calculation, Concluding remarks, prospects of wind energy for India	5

Textbooks

1	S.Rao Dr.B.B.Parulekar, "Energy Technology – Nonconventional, Renewable & Conventional", Khanna Publishers
2	S.P. Sukhatme and J K Nayak, "Solar Energy" McGraw Hill Education
3	B. S. Mangal, "Solar Power Engineering", Tata McGraw Hill, New Delhi 1990
4	Spera D. A. 1994 "Wind Turbine Technology, Fundamentals of concept in wind turbine Engg." ASME ebook

References

1	Culp, Archie W, "Principles of Energy Conversion", McGraw Hill Book Company
2	Rabl. A. 1985, "Active solar collectors and their applications" Oxford University press
3	John A Duffie, W. A. Beckman, "Solar Engineering of Thermal Processes", John Wiley and Sons INC
4	Gary L. Johnson, "Wind Energy Systems", Prentice Hall New Jersey
5	Sathyajith, Mathew, "Wind Energy Fundamentals, Resource Analysis and Economics", springer verlag Berlin
6	Kloeffler R.G, Sitz E.L (1946), "Electric Energy from Winds" Kansas State College of Engg., Manhattan Kans

Useful Links

1	https://nptel.ac.in/courses/103/103/103103206/
---	---

CO-PO Mapping

Programme Outcomes (PO)						
	1	2	3	4	5	6
CO1	1	1		2		
CO2					2	
CO3		2		2		

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	M. Tech. (Heat Power Engineering)
Class, Semester	Second Year M. Tech., Sem III
Course Code	6HP612
Course Name	Advanced Mathematical Methods in Engineering
Desired Requisites:	Engineering Mathematics

Teaching Scheme		Examination Scheme (Marks)			
Lecture	3 Hrs/week	MSE	ISE	ESE	Total
Tutorial	0 Hrs/week	30	20	50	100
Credits: 3					

Course Objectives

1	To introduce to solution methods of ODE
2	To introduce to solution methods to PDE
3	To introduce to simple regression and correlations

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Apply statistical techniques to analyze multivariate functions and simple regression and correlation	III	Applying
CO2	Analyze engineering problems by using the knowledge of ordinary and partial differential equations.	IV	Analysing
CO3	Solve Differential equations using different techniques	V	Evaluate

Module	Module Contents	Hours
I	Introduction to Probability Theory Probability Theory and Sampling Distributions. Basic probability theory along with examples. Standard discrete and continuous distributions like Binomial, Poisson, and Normal, Exponential etc.	5
II	Testing of Statistical Hypothesis Testing a statistical hypothesis, tests on single sample and two samples concerning means and Variances. ANOVA: One – way	4
III	Ordinary Differential Equations First-order equations (Linear, Separable Exact, Homogeneous,); Second Order linear differential equations (homogeneous and nonhomogeneous); Solution methods such as undetermined coefficients and variation of parameters.	4

IV	Partial Differential Equations and Concepts in Solution to Boundary Value Problems First order partial differential equations; Second order linear partial differential equations; Canonical forms; Fourier series, Second order equation (Parabolic, Elliptic and Hyperbolic) in rectangular	5
V	Solution techniques for PDE's Solution techniques such as separation of variables, eigenfunction expansions, integral transforms (Fourier and Laplace transforms); D'Alembert's solution for the Wave equation	4
VI	Simple Regression and Correlation The simplest deterministic mathematical relationship between two variables x and y, A Linear Probabilistic Mode, Estimating model parameters, inferences about slope parameters, correlations.	4

Textbooks

1	Ronald E, Walpole, Sharon L. Myers, Keying Ye, Probability and Statistics for Engineers and Scientists (8th Edition), Pearson Prentice Hall, 07
2	J. B. Doshi, Differential Equations for Scientists and Engineers, Narosa, New Delhi, 10

References

1	Douglas C. Montgomery, Design and Analysis of Experiments (7th Edition), Wiley Student Edition, 09.
2	S. P. Gupta, Statistical Methods, S. Chand & Sons, 37th revised edition, 08
3	William W. Hines, Douglas C. Montgomery, David M. Goldsman, Probability and Statistics for Engineering, (4th Edition), Wiley Student edition, 06.
4	Advanced Engineering Mathematics (9th Edition), Erwin Kreyszig, Wiley India (13)

Useful Links

1	https://nptel.ac.in/courses/111/104/111104031/
2	https://nptel.ac.in/courses/111/105/111105093/

CO-PO Mapping

Programme Outcomes (PO)						
	1	2	3	4	5	6
CO1						
CO2						
CO3						
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High Each CO of the course must map to at least one PO.						

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	M. Tech. (Heat Power Engineering)
Class, Semester	Second Year M. Tech., Sem III
Course Code	6HP613
Course Name	Food Preservation and Cold Chain Management
Desired Requisites:	Refrigeration and air conditioning

Teaching Scheme		Examination Scheme (Marks)			
Lecture	3 Hrs/week	MSE	ISE	ESE	Total
Tutorial	0 Hrs/week	30	20	50	100
Credits: 3					

Course Objectives

1	To understand the importance microorganisms in food preservation
2	To introduce the basics of various food processing and preservation technologies
3	To know the need and importance of preservation in dairy and fishery industry.
4	To analyze the compositional and technological aspects of milk and fish and other food products
5	To apply study of food preservation for preservation of various food products.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	To understand the importance of microorganisms in food preservation. To introduce the basics of various food processing and preservation technologies	III	Applying
CO2	To apply study of food preservation for preservation of various food products and cold chain management	IV	Analysing
CO3	To analyze the compositional and technological aspects of milk and fish and other food products during preservation	V	Evaluate

Module	Module Contents	Hours
I	Food Microbiology Principles of Food Preservation, microorganisms associated with foods bacteria, yeast and mold, Importance of bacteria, yeast and molds in foods. Classification of microorganisms based on temperature, pH, water activity, nutrient and oxygen requirements, typical growth curve of microorganisms. Classification of food based on pH, Food infection, food intoxication, definition of shelf life, perishable foods, semi perishable foods, shelve stable foods.	4

II	<p>Food Preservation by Low temperature</p> <p>Freezing and Refrigeration :</p> <p>Introduction to refrigeration, cool storage and freezing, definition, principle of freezing, freezing curve, changes occurring during freezing, types of freezing i.e. slow freezing, quick freezing, introduction to thawing, changes during thawing and its effect on food. Freezing methods -direct and indirect, still air sharp freezer, blast freezer, fluidized freezer, plate freezer, spiral freezer and cryogenic freezing.</p>	4
III	<p>Food Preservation by high temperature</p> <p>Commercial heat preservation methods: Sterilization, commercial sterilization, Pasteurization, and blanching.</p>	4
IV	<p>Food Preservation by Moisture control</p> <p>Drying and Dehydration - Definition, drying as a means of preservation, differences between sun drying and dehydration (i.e. mechanical drying), heat and mass transfer, factors affecting rate of drying, normal drying curve, names of types of driers used in the food industry. Drying methods and equipment, air convection dryer, tray dryer, tunnel dryer, continuous belt dryer, fluidized bed dryer, spray dryer, drum dryer, vacuum dryer, freeze drying ,foam mat drying. Evaporation – Definition, factors affecting evaporation, names of evaporators used in food industry.</p>	5
V	<p>Food Preservation by Irradiation and chemicals</p> <p>Introduction, units of radiation, kinds of ionizing radiations used in food irradiation, mechanism of action, uses of radiation processing in food industry, concept of cold sterilization. Recent Trends Pulsed electric fields, High pressure technology, Ohmic heating, Microwave heating, Hurdle technology.</p>	5
VI	<p>Cold chain and Cold Chain Management</p> <p>Freezing: requirements of refrigerated storage - controlled low temperature, air circulation and humidity, changes in food during refrigerated storage, progressive freezing, changes during freezing – concentration effect and ice crystal damage, freezer burn. Maintenance of controlled environment during transportation and sales outlets.</p>	4
Textbooks		
1	Potter NH, Food Science, CBS Publication, New Delhi, 1998.	
2	Ramaswamy H and Marcott M, Food Processing Principles and Applications CRC Press,2006	
References		
1	B. Srilakshmi, Food science, New Age Publishers,2002	
2	Meyer, Food Chemistry, New Age,2004	
3	Bawa. A.S, O.P Chauhanetal. Food Science. New India Publishing agency, 2013	
4	Frazier WC and Westhoff DC, Food Microbiology, TMH Publication, New Delhi, 2004	

5	Desrosier NW and Desrosier JN, The Technology of Food Preservation, CBS Publication, New Delhi, 1998
6	Paine FA and Paine HY, Handbook of Food Packaging, Thomson Press India Pvt Ltd, New Delhi- 1992
7	Toledo Romeo T, Fundamentals of Food Process Engineering, Aspen Publishers, 1999
Useful Links	
1	https://nptel.ac.in/courses/126/105/126105011/
2	https://nptel.ac.in/courses/126/103/126103017/

CO-PO Mapping						
Programme Outcomes (PO)						
	1	2	3	4	5	6
CO1				2	3	
CO2				2	2	
CO3			2			

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment
<p>The assessment is based on MSE, ISE and ESE.</p> <p>MSE shall be typically on modules 1 to 3.</p> <p>ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.</p> <p>ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.</p> <p>For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)</p>

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	M. Tech. (Heat Power Engineering)
Class, Semester	Second Year M. Tech., Sem III
Course Code	6IC602
Course Name	Constitution of India
Desired Requisites:	

Teaching Scheme		Examination Scheme (Marks)			
Lecture	3 Hrs/week	MSE	ISE	ESE	Total
Tutorial	-	30	20	50	100
Credits: 3					

Course Objectives

- | | |
|----------|--|
| 1 | To review and create awareness on various provisions in the constitution of India. |
|----------|--|

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Explain the premises informing the twin themes of liberty and freedom from a civil rights perspective.	II	Understanding
CO2	Address the growth of Indian opinion regarding modern Indian intellectuals constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism	II	Understanding
CO3	Address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution	II	Understanding

Module	Module Contents	Hours
I	History of Making of the Indian Constitution Drafting Committee, (Composition & Working)	4
II	Philosophy of the Indian Constitution : Preamble, Salient Feature	4
III	Contours of Constitutional Rights: Fundamental Rights; Right to Equality; Right to Freedom; Right against Exploitation; Right to Freedom of Religion; Cultural and Educational Rights; Right to Constitutional Remedies; Directive Principles of State Policy; Fundamental Duties.	5

IV	Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions	5
V	Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Pachayati raj: Introduction, PRI: Zila Pachayat. Elected officials and their roles, CEO ZilaPachayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy	5
VI	Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.	5

Textbooks

1	Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
2	M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014
3	D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015

References

1	The Constitution of India, 1950 (Bare Act), Government Publication
---	--

Useful Links

1	https://en.wikipedia.org/wiki/Constituent_Assembly_of_India
2	https://nptel.ac.in/courses/129/106/129106003/
3	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-1w02/
4	https://eci.gov.in/about/about-eci/the-functions-electoral-system-of-india-r2/

CO-PO Mapping

Programme Outcomes (PO)						
	1	2	3	4	5	6
CO1			1			
CO2	2					
CO3				1		2

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	M. Tech. (Mechanical Heat Power Engineering)
Class, Semester	Second Year M. Tech., Sem IV
Course Code	6HP691
Course Name	Dissertation Phase - IV
Desired Requisites:	

Teaching Scheme (Hrs)		Examination Scheme (Marks)			
Practical	10	LA1	LA2	ESE	Total
Interaction	-	100	0	0	100
Credits: 5					

Course Objectives

1	To develop the student to apply the knowledge gained to identify problem for research provide the solutions by self-study and interaction with stake holders
2	Acquire knowledge to tackle real world problems of societal concerns
3	Impart flexibility to the student to have increased control over his/ her learning.
4	Teachers would serve as mentor/facilitator of inquiry and reflection rather than as an instructor
5	Enhance student's learning through increased interaction with peers and colleagues.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Search the existing literature and identification of research problem	IV	Analysing
CO2	Design and develop the solution for complex engineering problem	V	Evaluating
CO3	Create the new knowledge in the specialized field	VI	Creating

Course Contents

Students are expected to carry out independent research work on the chosen topic. In this semester it is expected that the student has carried out substantial research work including exhaustive literature survey, formulation of the research problem, development/fabrication of experimental set-up (if any/required) and testing, and analysis of initial results thus obtained. In fourth semester, the students continue their dissertation work. It is expected that the student has completed most of the experimental/computation works and analyzed the results so obtained as proposed in the synopsis. The work should be completed in all respects in this semester. The students are required to submit the dissertation work in the form of report as per the institute rule.

Text Books

1	As per the research topic
---	---------------------------

References

1	National and International Journals
---	-------------------------------------

Useful Links	
1	https://nptel.ac.in/courses/110/104/110104073/

CO-PO Mapping						
Programme Outcomes (PO)						
	1	2	3	4	5	6
CO1	1			1		2
CO2			1		2	
CO3		2				2

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.				
Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	M. Tech. (Mechanical Heat Power Engineering)
Class, Semester	Second Year M. Tech., Sem IV
Course Code	6HP692
Course Name	Dissertation Phase - V
Desired Requisites:	

Teaching Scheme (Hrs)

Examination Scheme (Marks)

Practical	10	LA1	LA2	ESE	Total
Interaction	-	0	100	0	100
Credits: 5					

Course Objectives

1	To develop the student to apply the knowledge gained to identify problem for research provide the solutions by self-study and interaction with stake holders
2	Acquire knowledge to tackle real world problems of societal concerns
3	Impart flexibility to the student to have increased control over his/ her learning.
4	Teachers would serve as mentor/facilitator of inquiry and reflection rather than as an instructor
5	Enhance student's learning through increased interaction with peers and colleagues.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Search the existing literature and identification of research problem	IV	Analysing
CO2	Design and develop the solution for complex engineering problem	V	Evaluating
CO3	Create the new knowledge in the specialized field	VI	Creating

Course Contents

Students are expected to carry out independent research work on the chosen topic. In this semester it is expected that the student has carried out substantial research work including exhaustive literature survey, formulation of the research problem, development/fabrication of experimental set-up (if any/required) and testing, and analysis of initial results thus obtained. In fourth semester, the students continue their dissertation work. It is expected that the student has completed most of the experimental/computation works and analyzed the results so obtained as proposed in the synopsis. The work should be completed in all respects in this semester. The students are required to submit the dissertation work in the form of report as per the institute rule.

Text Books

1	As per the research topic
---	---------------------------

References	
1	National and International Journals
Useful Links	
1	https://nptel.ac.in/courses/110/104/110104073/

CO-PO Mapping						
Programme Outcomes (PO)						
	1	2	3	4	5	6
CO1				1		
CO2	1		1		2	2
CO3		2				2
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High Each CO of the course must map to at least one PO.						

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.				
Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40
Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.				

Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	M. Tech. (Mechanical Heat Power Engineering)
Class, Semester	Second Year M. Tech., Sem IV
Course Code	6HP693
Course Name	Dissertation Phase - VI
Desired Requisites:	

Teaching Scheme (Hrs)		Examination Scheme (Marks)			
Practical	12	LA1	LA2	ESE	Total
Interaction	-	0	0	100	100
Credits: 6					

Course Objectives

1	To develop the student to apply the knowledge gained to identify problem for research provide the solutions by self-study and interaction with stake holders
2	Acquire knowledge to tackle real world problems of societal concerns
3	Impart flexibility to the student to have increased control over his/ her learning.
4	Teachers would serve as mentor/facilitator of inquiry and reflection rather than as an instructor
5	Enhance student's learning through increased interaction with peers and colleagues.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Search the existing literature and identification of research problem	IV	Analysing
CO2	Design and develop the solution for complex engineering problem	V	Evaluating
CO3	Create the new knowledge in the specialized field	VI	Creating

Course Contents

Students are expected to carry out independent research work on the chosen topic. In this semester it is expected that the student has carried out substantial research work including exhaustive literature survey, formulation of the research problem, development/fabrication of experimental set-up (if any/required) and testing, and analysis of initial results thus obtained. In fourth semester, the students continue their dissertation work. It is expected that the student has completed most of the experimental/computation works and analyzed the results so obtained as proposed in the synopsis. The work should be completed in all respects in this semester. The students are required to submit the dissertation work in the form of report as per the institute rule.

Text Books

1	As per the research topic
---	---------------------------

References

1	National and International Journals
---	-------------------------------------

Useful Links	
1	https://nptel.ac.in/courses/110/104/110104073/

CO-PO Mapping						
Programme Outcomes (PO)						
	1	2	3	4	5	6
CO1	1			1		2
CO2	1		1		2	2
CO3		2				2

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High
Each CO of the course must map to at least one PO.

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.				
Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	M. Tech. (Mechanical Heat Power Engineering)
Class, Semester	Second Year M. Tech., Sem IV
Course Code	6IC601
Course Name	Value Education
Desired Requisites:	

Teaching Scheme		Examination Scheme (Marks)			
Lecture	2 Hrs/week	MSE	ISE	ESE	Total
Tutorial	-	30	20	50	100
Credits: 0					

Course Objectives

1	To impart knowledge on value of education and self- development.
2	To imbibe good values in students.
3	To highlight importance of character.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Explain value of education and self- development.	II	Understanding
CO2	Summarize importance of good character, and Behaviour development.	V	Evaluating

Module	Module Contents	Hours
I	Values and self-development –Social values and individual attitudes. Work ethics, Indian vision of humanism, Moral and non- moral valuation. Standards and principles, Value judgments.	6
II	Importance of cultivation of values, Sense of duty. Devotion, Self-reliance, confidence, Concentration. Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National Unity, Patriotism, Love for nature, Discipline.	6
III	Personality and Behaviour Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline, Punctuality, Love and Kindness, Avoid fault Thinking, Free from anger, Dignity of labour universal brotherhood and religious tolerance, True friendship, Happiness vs. suffering, love for truth, Aware of self-destructive habits, Association and Cooperation, Doing best for saving nature	7
IV	Character and Competence –Holy books vs. Blind faith, Self-management and Good health, science of reincarnation, Equality, Nonviolence, Humility, Role of Women, All religions and same message, Mind your Mind, Self-control. Honesty, Studying effectively	7

Text Books	
1	Chakroborty, S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi
References	
1	
Useful Links	
1	https://nimsuniversity.org/wp-content/uploads/2018/02/Value-Education-Human-Rights-and-Legislative-Procedures.pdf
2	http://cbseacademic.nic.in/web_material/ValueEdu/Value%20Education%20Kits.pdf
3	https://www.verywellmind.com/personality-development-2795425
4	https://trudreadz.com/2019/09/10/blind-faith-in-religion-destroys-our-ability-to-critically-think-for-ourselves/

CO-PO Mapping						
	Programme Outcomes (PO)					
	1	2	3	4	5	6
CO1	2				1	2
CO2	1		1			2
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High Each CO of the course must map to at least one PO.						