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CHOICE BASED CREDIT SYSTEM FOR PG COURSE (HEAT POWER ENGINEERING) IN GONDWANA UNIVERSITY, GADCHIROLI

(WITH EFFECT FROM 206-17)

1.0 PRELIMINARY DEFINITIONS

1.1 'Program' means Degree program like M.E., M. Tech. etc

1.2 'Specialization' means a discipline of the Post Graduate (Nomenclature P for Pg and U for UG) program like Energy Management Systems, CAD/ CAM, Structural Engineering, Electrical Power System, Computer Science Engineering, Electronics Engineering etc.

1.3 'Course' means a Theory or a Practical subject that is to be studies by a student in a Semester.

1.4 'Board' means Board of Studies at the University level.

2.0 STRUCTURE OF THE PROGRAM

2.1 Every Post Graduate Program in the Faculty of Engineering & Technology shall have a Scheme for Teaching & Examinations along with the Syllabi. The Subjects in a particular Course shall be categorized as follows :

- Foundation Courses (F) : This may include basic courses with relevant syllabus required for that particular specialization like Mathematics and so on.
- Professional Core Courses (C) : This shall include the core course relevant to a particular specialization and shall be compulsory for all the concerned students.
- Professional Elective (P) : This will be in the form of POOL of subjects offered to the students so as to suite their CHOICE. This may belong to the same BOARD or the other BOARD, however, in the same FACULTY of Engineering & Technology.
- Employability Enhancement Courses (E) : This will include Project Work/ Internship/ Seminar/ Professional Practices/ Case Study/ Industrial or Practical Training.

3.0 NUMBER OF COURSES PER SEMESTER AND CREDIT ASSIGNMENT

3.1 Curriculum of s semester shall have justified blend of theory and Practical subjects including Employability Enhancement Courses. The Courses shall have the credits as per pattern mentioned in next section below.

3.2 The credit shall be based on following common base **:**

Contact Hours / Week	Credit	
One Theory	1	**(The Contact Hours per week for Theory, Practical and Tutorial shall be only in the multiple of 2)**
One Tutorial	1	
Two Practical	1	

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4.0 GENERAL RULES WHILE DESIGNING CURRICULUM & SYLLABI

4.1 The common format as provided shall be followed, as far as possible.

4.2 The number of subjects in each semester and their credits may be justifiably decided by the concerned BOS. However, the total credits (including in all four semesters) shall be same for all the specialization, in a faculty, as far as possible.

4.3 The first TWO semesters shall not have any inter Board of Studies/ inter Faculty subjects. However, it may have Professional ELECTIVES (Core) which are restricted to its parent Board of Studies only. (BOS)

4.4 The Practical subjects may be introduced as per requirement of the respective Board, restricted to the parent BOS itself only to which the specialization is attached

4.5 The 3rd / 4th Semesters may have subjects on Project/ Case Study/ Industrial Training/ Seminar/ self study papers etc.

4.6 Incentive Marks inclusion Technique : The SGPA of II and IV Semester shall be supplemented to provide weightage to the incentive marks sent by the College. The procedure shall be as mentioned below :

- Let 'x' is the incentive marks allotted to a student. These marks shall be directly supplemented in a non-theory subject decided by the Faculty, subject to the condition that consequent total marks shall not be more than maximum marks in that particular non-theory subject Head. The SGPA shall be calculated as usually.

4.7 The failure students in present Credit Based System in the University shall have **THREE** last chances to pass examination in the earlier pattern, as mentioned below :

FIRST SEMESTER	SECOND SEMESTER	THIRD SEMESTER	FOURTH SEMESTER
WIN-16, SUM-17, WINT-17	WIN-16, SUM-17, WINT-17	WIN-16, SUM-17, WINT-17	WIN-16, SUM-17, WINT-17

4.8 With effect from summer – 2018 examinations, all the failure students shall be absorbed in CBCS pattern, as per respective Equivalence Scheme.

4.9 The Equivalence scheme shall be submitted by the respective BOS so as to absorb students from Credit Based System to Choice Based Credit System.

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5.0 MARKS TO GRADE AND GRADE EXPLANATION SCHEME

The Faculty shall decide the conversion of MARKS to equivalent GRADES in CBCS. The proposed format is mentioned below :

% SCORE (x) in Theory	% SCORE (x) in Practical	Grade	Grade Points (on 10 point scale)	Grade
80 ≤ **x** ≤ **100**	85 ≤ **x** ≤ **100**	A+	10	OUTSTANDING
70 ≤ **x** ≤ **79**	80 ≤ **x** ≤ **84**	A	9	EXCELLENT
60 ≤ **x** ≤ **69**	75 ≤ **x** ≤ **79**	B+	8	VERY GOOD
55 ≤ **x** ≤ **59**	70 ≤ **x** ≤ **74**	B	7	GOOD
50 ≤ **x** ≤ **54**	65 ≤ **x** ≤ **69**	C+	6	FAIR
45 ≤ **x** ≤ **49**	60 ≤ **x** ≤ **64**	C	5	AVERAGE
40 ≤ **x** ≤ **44**	50 ≤ **x** ≤ **59**	D	4	PASS
00 ≤ **x** ≤ **39**	00 ≤ **x** ≤ **49**	**F**	**0**	**FAIL**
Absent in Examination	**Absent in Examination**	**Z**	**-**	**ABSENT**

6.0 GENERAL RULES

6.1 In Memo of Marks, the name of the subject with respect to the subject code shall be printed. This will be more important wherever optional subjects are there. Under such cases, the subject opted by the student (means filled by the student in examination form) only shall be printed. It is therefore, recommended that the examination form of CBCS should have provision to the fill the subject code very clearly, with clear 'SEVEN' columns, as the subject code is of '7' Letters.

6.2 CGPA to percentage transformation shall be as per prevailing Direction only for '10' points scale.
6.3 ATKT shall be applicable as is in force in the respective Faculty.
6.4 The Marks secured by the Examinees shall NEVER be reflected in any Memo of Marks

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7.0 TEACHING AND EXAMINATION SCHEME SPECIMEN

GONDWANA UNIVERSITY, GADCHIROLI

MASTER OF TECHNOLOGY IN HEAT POWER ENGINEERING

(TWO YEARS COURSE IN FACULTY OFENGINEERING & TECHNOLOGY)

COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

I– SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme									
			Hours per week			No. of Credits	Theory						Practical			
			L	Field Work/ Assignment / Tutorial	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								ESE	MSE	IE			TW	PEE		
PHPS11	C	Advanced Heat and Mass Transfer	3	2	-	4	3	70	10	20	100	50	-	-	-	-
PHPS12	C	Advanced Thermodynamics	3	2	-	4	3	70	10	20	100	50	-	-	-	-
PHPS13	C	Thermal Engineering-I	3	2	-	4	3	70	10	20	100	50	-	-	-	-
PHPS14x	P	Elective-I	3	2	-	4	3	70	10	20	100	50	-	-	-	-
Laboratories/ Practical																
PHPS15	C	Heat Power Engineering Lab – I	-	-	2	1	3	-	-	-	-	-	25	25	50	25
PHPS16	E	Seminar-I			2	1	3						50	50	50	25
TOTAL			12	08	4	18	-	400					100			
SEMESTER TOTAL			24			18	500									

Elective-I(X): ***(A) Advanced power Plant Engineering. (B): Cryogenic Engineering. (C): Computer Aided Design.***

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***8*.0 TEACHING AND EXAMINATION SCHEME SPECIMEN**

GONDWANA UNIVERSITY, GADCHIROLI

MASTER OF TECHNOLOGY IN HEAT POWER ENGINEERING

(TWO YEARS COURSE IN FACULTY OFENGINEERING & TECHNOLOGY)

COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

II– SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme									
			Hours per week			No. of Credits	Theory						Practical			
			L	Field Work/ Assignment/ Tutorial	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks (Sessional)		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								ESE	MSE	IE			TW	PEE		
PHPS21	C	Fluid Dynamics	3	2	-	4	3	70	10	20	100	50	-	-	-	-
PHPS22	C	Advanced Refrigeration and Air Conditioning	3	2	-	4	3	70	10	20	100	50	-	-	-	-
PHPS23	C	Thermal Engineering-II	3	2	-	4	3	70	10	20	100	50	-	-	-	-
PHPS24x	P	Elective – II (x)	3	2	-	4	3	70	10	20	100	50	-	-	-	-
Laboratories/ Practical																
PHPS25	C	Heat Power Engineering Lab –II	-	-	2	1	3	-	-	-	-	-	25	25	50	25
PHPS26	E	Seminar-II			2	1	3						50	50	50	25
TOTAL			12	08	4	18	-	400					100			
SEMESTER TOTAL			24			18	500									

Elective – II (x) :(A) Design of Heat Transfer Equipments (B) Design of I.C. Engine Components and Subsystems. (C)Thermal Storage Systems

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8.0 TEACHING AND EXAMINATION SCHEME SPECIMEN

GONDWANA UNIVERSITY, GADCHIROLI

MASTER OF TECHNOLOGY IN HEAT POWER ENGINEERING

(TWO YEARS COURSE IN FACULTY OFENGINEERING & TECHNOLOGY)

COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

III– SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme									
			Hours per week			No. of Credits	Theory						Practical			
			L	Field Work/ Assignment / Tutorial	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
									Sessional							
								ESE	MSE	IE			TW	PEE		
PHPS31	C	Solar and Wind Energy Utilization	3	2	-	4	3	70	10	20	100	50	-	-	-	-
PHPS32x	P	Elective – III (x)	3	2	-	4	3	70	10	20	100	50	-	-	-	-
Laboratories/ Practical																
PHPS33	E	Grand Seminar? Industrial Training		10		5	3						100	-	100	50
PHPS34	E	Pre-Dissertation	-	10		5	3	-	-	-	-	-	200	-	200	100
TOTAL			6	24		18	-	200					300			
SEMESTER TOTAL			30			18	500									

Elective – III (x): (A): Advanced Fluid Mechanics. (B): Thermal Measurements & Process Controls. (C): Turbo Machines.

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8.0 TEACHING AND EXAMINATION SCHEME SPECIMEN

GONDWANA UNIVERSITY, GADCHIROLI

MASTER OF TECHNOLOGY IN HEAT POWER ENGINEERING

(TWO YEARS COURSE IN FACULTY OFENGINEERING & TECHNOLOGY)

COURSE AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

IV– SEMESTER

Unique Subject Code (USC)	Course type	Subject	Teaching Scheme				Examination Scheme								
			Hours per week			No. of Credits	Theory					Practical			
			L	Field Work/ Assignment/ Tutorial	P		Duration of Paper (Hrs.)	Max Marks	Max. Marks		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
									Sessional							
								ESE	MSE	IE			TW	PEE		
PHPS41	E	Final Dissertation	-	24		18	3						250	250	500	250
		TOTAL		24		18	-						**500**			
		SEMESTER TOTAL	**24**			**18**	**500**									

9.0 of the respective Board, restricted to the parent BOS itself only to which the specialization is attached

10.0The 3rd / 4th Semesters may have subjects on Project/ Case Study/ Industrial Training/ Seminar/ self study papers etc.

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11.0Incentive Marks inclusion Technique : The SGPA of II and IV Semester shall be supplemented to provide weightage to the incentive marks sent by the College. The procedure shall be as mentioned below :

- Let 'x' is the incentive marks allotted to a student. These marks shall be directly supplemented in a non-theory subject decided by the Faculty, subject to the condition that consequent total marks shall not be more than maximum marks in that particular non- theory subject Head. The SGPA shall be calculated as usually.

12.0The failure students in present Credit Based System in the University shall have **THREE** last chances to pass examination in the earlier pattern, as mentioned below :

FIRST SEMESTER	SECOND SEMESTER	THIRD SEMESTER	FOURTH SEMESTER
WIN-16, SUM-17, WINT-17	**WIN-16, SUM-17, WINT-17**	**WIN-16, SUM-17, WINT-17**	**WIN-16, SUM-17, WINT-17**

13.0With effect from summer – 2018 examinations, all the failure students shall be absorbed in CBCS pattern, as per respective Equivalence Scheme.

14.0The Equivalence scheme shall be submitted by the respective BOS so as to absorb students from Credit Based System to Choice Based Credit System.

15.0The Faculty shall decide the conversion of MARKS to equivalent GRADES in CBCS. The proposed format is mentioned below :

% SCORE (x) in Theory	% SCORE (x) in Practical	Grade	Grade Points (on 10 point scale)
80 ≤ **x ≤ 100**	85 ≤ **x ≤ 100**	A+	10
70 ≤ **x ≤ 79**	80 ≤ **x ≤ 84**	A	9
60 ≤ **x ≤ 69**	75 ≤ **x ≤ 79**	B+	8
55 ≤ **x ≤ 59**	70 ≤ **x ≤ 74**	B	7
50 ≤ **x ≤ 54**	65 ≤ **x ≤ 69**	C+	6
45 ≤ **x ≤ 49**	60 ≤ **x ≤ 64**	C	5
40 ≤ **x ≤ 44**	50 ≤ **x ≤ 59**	D	4
00 ≤ **x ≤ 39**	00 ≤ **x ≤ 49**	**F**	**0**
Absent in Examination	**Absent in Examination**	**Z**	**-**

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16.0In Memo of Marks, the name of the subject with respect to the subject code shall be printed. This will be more important wherever optional subjects are there. Under such cases, the subject opted by the student (means filled by the student in examination form) only shall be printed. It is therefore, recommended that the examination form of CBCS should have provision to the fill the subject code very clearly, with clear 'SEVEN' columns, as the subject code is of '7' Letters.

17.0CGPA to percentage transformation shall be as per prevailing Direction only for '10' points scale.

18.0ATKT shall be applicable as is in force in the respective Faculty.

Dr.M.Basavaraj
Chairman,
BOS, Department of Mechanical Engineering
Gondwana University, Gadchiroli

Name of the Program : **III Semester M. Tech. (Heat Power Engineering)**
Subject Code : **PHPS31**
Subject Title : **Solar and Wind Energy Utilisation**

Course Scheme					Examination Scheme				
Lecture	Tutorial	Practical	Periods per week	Credits	Duration of Paper, Hrs	MSE	IE	ESE	Total
03	02	-	04	04	03	10	20	70	100

Contents

1. **Solar Resources**: Passage through atmosphere, global distribution, optimal system geometry, Insulation amount available on earth, Resource estimation, solar data, solar radiation spectrum, seasonal and daily variation, effect of tilt angle.

   Solar Photovoltaic: The photo voltaic effect, spectral response, p-n junction, different types of photovoltaic cells, PV cell characteristic, effect of variation of temperature, equivalent circuits, Photovoltaic modules, module specification, PV arrays and system, storage batteries, charge regulators and controllers, Tracking system, Autonomous PV system, Grid linked PV system, System performance, economics and future prospects, and numerical

2. **Solar Thermal**: Principles of applied heat transfer, solar thermal collectors, glazing, evacuation, selective surfaces. Concentrators, types and applications, solar thermal applications water and space heating, solar ponds, dryers, distillation, solar cooker, passive solar design and numerical.

3. **Wind Resources** : Nature of atmospheric wind, wind resource characteristic and assessment, Anemometry wind statistics, Weibull distribution, Aerofoil characteristic, lift, drag, stall, Design of wind turbine with blade twist and taper, effect of stall and blade pitch, optimal choice of cut-in, rated and cut-in speeds. Control policies and their effect on energy capture.

4. **Planning of wind farms**: special function for develop countries, cost of electricity from wind farm,. Environmental assessment, noise, visual impact, wind statistics. Atmospheric turbulence. Gust wind speed, effect of topography, aerodynamic loads, tower shadow, wind shear, blade coning, gyroscopic, transient and extreme loads. Damping and stability, teetering motion.

Text and Reference Books:

1. Renewable Energy Sources by Twidell and Weir, ELBS London
2. Solar Engineering of Thermal Processing by Duffy and Beckman
3. Solar Photovoltaic Engineering System by Messenger
4. Solar Energy by Dr. S.P. Sukhatme.
5. Wind Machines by Frank Eldridge VNR int. London
6. Energy Technology by Rao – Parulekar Khanna Publisher
7. Non-Conventional Energy Sources by G. D. Rai, Khanna publishers
8. Handbook on Energy Efficiency by Y. D. Goswami
9. Solar Energy by J.P.Garg and Prakash.

Name of the Program : III Semester M. Tech. (Heat Power Engineering)
Subject Code : PHPS32x
Subject Title :Elective-III. (A) Advanced Fluid Mechanics

Course Scheme					Examination Scheme				
Lecture	Tutorial	Practical	Periods per week	Credits	Duration of Paper, Hrs.	MSE	IE	ESE	Total
03	02	-	04	04	03	10	20	70	100

UNIT – I

Introduction to Fluid Mechanics: - Properties of fluids, Types of fluids, Newton's law of viscosity & its applications, Surface tension & capillarity.

Pascal's law, Hydrostatic law, Fluid pressure & its measurements (simple & Differential Manometers)

Hydrostatics: - Pressure variations in compressible & incompressible fluids, Forces on submerged plane surfaces & curved surfaces.

UNIT – II

Buoyancy, center of Buoyancy, Metacenter, Metacentric height, Stability of floating and submerged bodies.

Kinematics of fluid flow: - Types of flow, Path line, stream line, stream tube streak line, Continuity equation, Velocity Potential function & Stream function.

Dynamics of fluid flow: - Euler's equation of motion, Derivation of Bernoulli's equation for incompressible flow.

UNIT – III

Measurement of Fluid Flow: - Through ducts: Venturimeter, Through Reservoirs: Large Orifice & through open channels: Discharge over triangular, Rectangular & Trapezoidal notch

Viscous Flow:- Flow of Viscous fluid through circular pipe, Flow of viscous fluid between two parallel plates, Kinetic energy Correction factor & Momentum Correction factor.

Turbulent flow: - Reynolds's experiment, frictional loss in pipe flow.

Flow through pipes: - Equations of pipe flow, Losses in pipes & fittings, Hydraulic Gradient Line & Total energy Line, Syphon, Flow through pipe in series and parallel, Flow through branched pipes, Power transmission through pipe, Flow through nozzle, Water Hammer.

UNIT – IV

Dimensional Analysis: - Dimensional Homogeneity, Rayleigh's method, Buckingham's π-Theorem.

Boundary Layer flow:- Boundary Layer concepts, Boundary Layer thickness, Displacement thickness, Momentum thickness, energy thickness, Momentum Integral equation for boundary layer (Von Karman), Separation, Drag and Lift on immersed bodies.

TEXT BOOKS:

1. Fluid Mechanics & hydraulic Machines - Dr. V.M. Domkundwar
2. Fluid Mechanics & Fluid Power Engineering - D.S.Kumar 3. Fluid Mechanics & hydraulic Machines - R.K.Bansal

Name of the Program : III Semester M. Tech. (Heat Power Engineering)
Subject Code : PHPS32x
Subject Title : Elective-III. (B)Thermal Measurements & process controls

Course Scheme					Examination Scheme				
Lecture	Tutorial	Practical	Periods per week	Credits	Duration of Paper, Hrs.	MSE	IE	ESE	Total
03	02	-	04	04	03	10	20	70	100

UNIT-I

GENERAL CONCEPTS: Fundamental elements of a measuring instrument. Static and dynamic characteristics –errors in instruments – Different methods of measurement and their analysis – Sensing elements and transducers.

Measurement of pressure – principles of pressure measurement, static and dynamic pressure, vacuum and high pressure measuring – Measurement of low pressure, Manometers, Calibration methods, Dynamic characteristics- design principles.

UNIT-II

MEASUREMENT OF FLOW: Obstruction meters, variable area meters. Pressure probes, compressible fluid flow measurement, Thermal anemometers, calibration of flow measuring instruments. Introduction to design of flow measuring instruments.

UNIT-III

TEMPERATURE MEASUREMENT: Different principles of Temperature Measurement, use of bimetallic thermometers – Mercury thermometers, Vapor Pressure thermometers,

Thermo positive elements, thermocouples in series & parallel, pyrometry, measurement of heat flux, calibration of temperature measuring instruments. Design of temperature measuring instruments.

UNIT-IV

Level Measurement: Direct & indirect methods, Manometric methods, float level meters, electrical conductivity, Capacitive, Ultrasonic, and Nucleonic Methods.

Measurement of density – Hydrometer, continuous weight method, Gamma rays, Gas impulse wheel. Velocity Measurement – Coefficient of viscosity, Ostesld method, free fall of piston under gravity, torque method.

Measurement of moisture content and humidity.

Measurement of thermal conductivity of solids, liquids and gases.

UNIT-V

PROCESS CONTROL: Introduction and need for process control principles, transfer functions, block diagrams, signal flow graphs, open and closed loop control systems – Analysis of First & Second order systems with examples of mechanical and thermal systems.

Control System Evaluation – Stability, steady state regulations, and transient regulations.

REFERENCES:

1. Measurement System, Application & Design – E.O. Doeblin.
2. Mechanical and Industrial Measurements – R.K. Jain – Khanna Publishers.
3. Mechanical Measurements – Buck & Beckwith – Pearson.
4. Control Systems, Principles & Design, 2nd Edition – M. Gopal – TMH.

Name of the Program : III Semester M. Tech. (Heat Power Engineering)
Subject Code : PHPS32x
Subject Title : Elective-III. (C) Turbo-Machines

Course Scheme					Examination Scheme				
Lecture	Tutorial	Practical	Periods per week	Credits	Duration of Paper, Hrs.	MSE	IE	ESE	Total
03	02	-	04	04	03	10	20	70	100

UNIT -I

Introduction: Definition of turbo machine, parts of turbo machines,
Comparison with positive displacement machines, Classification, Dimensionless parameters and their significance, Effect of Reynolds's number, Unit and specific quantities, model studies. Application of first and second laws of thermodynamics to turbo machines, Efficiencies of turbo machines. Problems.

Thermodynamics of fluid flow: Static and Stagnation states- Incompressible fluids and perfect gases, overall isentropic efficiency, stage efficiency (their comparison) and polytrophic efficiency for both compression and expansion processes. Reheat factor for expansion process.

UNIT – II

Energy exchange in Turbo machines: Euler's turbine equation,Alternate form of Euler's turbine equation, Velocity triangles for different values of degree of reaction, Components of energy transfer, Degree of Reaction, utilization factor, Relation between degree of reaction and Utilization factor, Problems.

General Analysis of Turbo machines: Radial flowcompressors and pumps
– General analysis, Expression for degree of reaction, velocity triangles,
Effect of blade discharge angle on energy transfer and degree of reaction,
Effect of blade discharge angle on performance, Theoretical head – capacity relationship, General Analysis of axial flow pumps and compressors, degree of reaction, velocity triangles, Problems.

UNIT – III

Steam Turbines: Classification, Single stage impulse turbine, condition for maximum blade efficiency, stage efficiency, Need and methods of compounding, Multi-stage impulse turbine, expression for maximum utilization factor, Reaction turbine – Parsons' turbine, condition for maximum utilization factor, reaction staging. Problems.

Hydraulic Turbines: Classification, Different efficiencies, Peloton turbine – velocity triangles, design parameters, Maximum efficiency. Francis turbine - velocity triangles, design parameters, runner shapes for different blade speeds. Draft tubes- Types and functions. Kaplan and Propeller turbines - velocity triangles, design parameters. Problems.

UNIT – IV

Centrifugal Pumps: Classification and parts of centrifugal pump, different heads and efficiencies of centrifugal pump, Minimum speed for starting the flow, Maximum suction lift, Net positive suction head, Cavitation, Need for priming, Pumps in series and parallel. Problems.

Centrifugal Compressors: Stage velocity triangles, slip factor, power input factor, Stage work, Pressure developed, stage efficiency and surging and problems.

TEXT BOOKS:

1. **An Introduction to Energy Conversion**, Volume III, Turbo machinery, **V**. Kadambi and Manohar Prasad, New Age
   International Publishers, reprint 2008.
2. **Turbines, Compressors & Fans**, S. M. Yahya, Tata McGraw Hill Co. Ltd., 2nd edition, 2002

REFERENCE BOOKS:

1. **Principals of Turbo machines**, D. G. Shepherd, The Macmillan Company (1964).
2. **Fluid Mechanics & Thermodynamics of Turbo machines**, S. L. Dixon, Elsevier (2005).
3. **Turbo machine**, B.K.Venkanna PHI, New Delhi 2009.
4. **Text Book ofTurbo machines,** M. S. Govindgouda and A. M. Nagaraj, M. M. Publications, 4Th Ed, 2008.

Name of the Program : III Semester M. Tech. (Heat PowerEngineering)
Course Code : PHPS33
Course Title : Grand Seminar /Industrial Training

Course Scheme					Examination Scheme				
Lecture	Tutorial	Practical	Periods per week	Credits	Duration of Paper, Hrs	MSE	IE	ESE	Total
--	10	-	05	05	--	--	100	--	100

Contents

Admitted candidates are required to deliver a seminar on any topic based on all courses of First and Second Semester of the program Further that the selected topic will be other than topic/area of study selected for the Dissertation during third and fourth semester. Candidate is required to submit the report with minimum 40 pages for the final evaluation.

Name of the Program : III Semester M. Tech. (Heat PowerEngineering)
Course Code : PHPS34
Course Title : Pre Dissertation

Course Scheme					Examination Scheme		
Lecture	Tutorial	Practical	Periods per week	Credits	TW	POE	Total
--	10	-	05	05	200	--	200

Contents

Student is expected to choose the topic of his/her dissertation. The scope of proposed study must be in the relevant discipline/area. Student is expected to carry out the following –

1. Identification of proposed Topic/Area of Study for the Dissertation
2. Literature Review related to proposed topic
3. Formulation of Scope & Methodology for the proposed study.
4. Formulation of Hypothesis for the selected study.
5. Preliminary Dissertation.

Student should prepare & submit a Pre-Dissertation report minimum 50 pages in the given format, covering the above mentioned tasks. Evaluation will be on the basis of brief report on dissertation study undertaken on specified date at the end of semester through seminar &viva-voce.

Name of the Program : IV Semester M. Tech. (Heat PowerEngineering)
Course Code : PHPS41
Course Title : Final Dissertation

Course Scheme					Examination Scheme		
Lecture	Tutorial	Practical	Periods per Week	Credits	TW	POE	Total
-	24		18	18	250	250	500

Contents

Student is expected to carry out further work on the topic of his dissertation selected in Third Semester. For completion of the selected Dissertation study, the given student is to undertake various activities like Design and fabrication, System Analysis, System Modeling, System Design and Testing. The student has to deliver a pre-submission seminar on the specified schedule before final submission of the study report in the specified format with minimum of 70 pages. The student is also expected to write and register at least two research papers on his/her study undertaken in refereed journals and conferences. Evaluation for this component will be on the basis of submitted Report, Seminar & Viva-Voce.