RTM Nagpur University- Mechanical Engineering
B.Tech 5th Semester
Heat Transfer (BTME501T)
Syllabus (Theory)

Semester	Course Title (Subject)	Hours / Week			Credits	Maximum Marks			Exam Duration (Hrs.)
		L	T	P		Continual Assessment	University Examination	Total	
V	**Heat Transfer**	3	-	-	3	30	70	100	3

Sr. No.	Course Objective The objective of this course is–
1	This course is designed to learn the different modes of heat transfer like conduction, convection & Radiation and formulation of problem based on required application.
2	It will help students to distinguish between steady and unsteady state heat transfer and their applications will enable to calculate heat transfer rate from different geometry of the system under free and forced convection.
3	It also aims to impart knowledge to analyze radiation with and without radiation shield. In addition, it also discusses methods to analyze & design heat exchangers.
4	In all to generate interest in learning to develop in depth understanding in Heat Transfer.

Course Outcomes

After successful completion of this course the student will be able to:

CO1	Students will be able to define and compare the different modes of heat transfer and calculation of thermal resistance and heat transfer through plane and composite wall, cylinder and sphere.
CO2	Students will be able to apply the concept of internal heat generation for the calculation of heat transfer for plane wall, cylinder and sphere and also learn about various types of fins and their significance in steady state conduction heat transfer calculations. It will also help them to understand the concept of unsteady state heat transfer.
CO3	Students will be able to select and apply appropriate empirical correlations to estimate forced convection and free convection heat transfer, for internal and external flows.
CO4	Students will be able to evaluate heat transfer rate by radiation from ideal and actual surfaces and enclosures of different geometries.
CO5	Students will be able to evaluate heat exchanger performance for the given geometry and boundary conditions to deliver a desired heat transfer rate.

SYLLABUS	
Contents	
Unit I	No of hours
Introduction to heat transfer, Basic modes of Heat Transfer, Conduction, Convection & Radiation. Laws of Heat transfer, General heat conduction equation in Cartesian coordinate system (Derivation), General heat conduction equation in Cylindrical and Spherical coordinates (Only expression). One dimensional steady state heat conduction equation for plane wall, cylinder and sphere, Overall heat transfer coefficient. Thermal resistance of composite structure, contact resistance, critical thickness of insulation. (Numerical treatment expected)	07
Unit II	
Conduction with internal heat generation for plane wall, Cylinder and Sphere Numericals on plane wall only. **Unsteady state heat transfer**, lumped heat capacity analysis, Heisler's charts. Biot's Number, Fourier's Number & its significance. **Extended surface**, Types of Fins, temperature distribution and their heat transfer rate, Fin efficiency & Effectiveness. (Numerical treatment expected).	07
Unit III	
Forced convection :Concept of hydrodynamics & thermal boundary layer thickness, local and average heat transfer coefficient. Flow over flat plate, cylinder. Laminar & turbulent flow through pipe.(Numerical treatment expected). **Free or Natural Convection** :Flow over horizontal and vertical plates, cylinders (Numerical treatment expected) **Boiling and Condensation heat transfer**: Pool boiling curve and regimes of pool boiling, Film and Drop wise condensation (Only theoretical concept).	07
Unit IV	
Radiation: Radiation from all bodies, Laws of radiation, Emissivity, Absorptivity, Transmissivity, Reflectivity, Radiosity, Emissive power, Irradiation, Shape Factor. Laws of Shape Factor,Radiation exchange between parallel plates, cylinder & spheres. (Numerical treatment expected). Radiation shields (Only Concept).	07
Unit V	
Heat exchanger: Detail Classification, Overall Heat Transfer Coefficient, Fouling Factor, LMTD & Effectiveness -NTU method of heat exchanger analysis for parallel, counter flow arrangement. (Numerical treatment expected).	07

Books Recommended:

Text Book

1. Fundamentals of Heat & Mass Transfer, Incropera, F.P., Dewitt, D. P., John Wiley & Sons.
2. Heat Transfer, J.P. Holman, McGraw Hill Book Company, New York.
3. Fundamentals of Heat and Mass Transfer, K. N. Seetharam & T.R. Seetharam, Willey.
4. Engineering Heat and Mass Transfer, M.M. Rathor, Laxmi Publications Pvt. Ltd.

Reference Book

1. Fundamentals of Heat and Mass Transfer, Venkanna B.K., PHI Publication.
2. Principles of Heat Transfer, Frank Kreith, Harper and Row Publishers, New York.
3. Heat Transfer - A Practical Approach, Yunus A. Cengel, Tata McGraw Hill Publishing Company Ltd., New Delhi.
4. Heat & Mass Transfer, M.N. Ozisik, Tata McGraw Hill Publishing Company Ltd., New Delhi.
5. Heat & Mass Transfer, R.K. Rajput, Laxmi Publication.

DATA BOOK:

1. Heat & Mass Transfer, Domkundwar, Dhanapat Rai & Sons Publication.
2. Heat & Mass Transfer, C.P.Kothandaraman, PHI publishers.

RTM Nagpur University- Mechanical Engineering
B.Tech 5th Semester
Heat Transfer Lab (BTME501P)
Syllabus (Practical)

Semester	Course Title(Subject)	Hours / Week			Credits	Maximum Marks		
		L	T	P		Continual Assessment	University Examination	Total
V	Heat Transfer Lab	-	-	2	1	25	25	50

Course Outcomes	
After successful completion of this course the student will be able to:	
CO1	Students will be able to determine the heat transfer rates through various cross-sections and mediums in different modes.
CO2	Student will be able to acquire, tabulate, analyze experimental data, and draw interpretation and conclusions
CO3	Student will be able to calculate radiation heat transfer and utilize that knowledge in designing any heat transfer application.
CO4	Student will be able to understand heat exchanger analysis.
CO5	Student will able to select the proper heat exchangers per system requirements.

List of Practical's

Sr. No.	List of Practical's
01	To determine the thermal conductivity of insulating material.
02	To determine the thermal conductivity of metal bar.
03	Determination of thermal conductivity of composite wall.
04	Determination of Stefan Boltzmann constant.
05	Determination of heat transfer coefficient in natural convection for vertical tube.
06	To determine heat transfer coefficient in forced convection for fluid flowing through a duct.
07	Determination of temperature distribution & heat transfer rate from fin under free and forced convection.
08	Determination of emissivity of non-black body.
09	To determine the effectiveness of a concentric tube heat exchanger.
10	To determine the critical heat flux.
11	Determination of heat transfer rate in unsteady state heat transfer.
12	To determine the heat transfer coefficient in film wise and drop wise condensation.

13	Determination of performance of shell and tube heat exchanger using computer-based setup.
14	Minimum 2-3 virtual experiment to be conducted.
15	Study of various types of Heat Exchangers.

Note : At least 8 practicals from the above list are expected.

RTM Nagpur University- Mechanical Engineering
B.Tech 5th Semester
Energy Conversion - I (BTME502T)
Syllabus (Theory)

Semester	Course Title (Subject)	Hours / Week			Credits	Maximum Marks			Exam Duration (Hrs.)
		L	T	P		Continual Assessment	University Examination	Total	
V	Energy Conversion-I	3	-	-	3	30	70	100	3

Sr. No.	Course Objective The objective of this course is–
1	To expose the students to the practical applications of engineering thermodynamics & working of steam power plants.
2	To gain the knowledge of various components of the thermal power plant like boiler, nozzles, turbines and condensers and will be able to evaluate the performance parameters of these components.
3	To understand the concept of utilizing residual heat in thermal systems.

Course Outcomes	
After successful completion of this course the student will be able to:	
CO1	Explain, classify, analyze the steam generators (i.e. Boilers), boiler mountings & accessories. Also evaluate the performance parameters of boiler.
CO2	Explain the concepts of fluidized bed boilers and various draught system and evaluate performance parameters of natural draught system (i.e. chimney).
CO3	Explain the importance of steam nozzle and determine its throat area, exit area, exit velocity. Also compare impulse and reaction steam turbines and explain the concept of governing of steam turbine.
CO4	Explain the methods of compounding of steam turbine, various energy losses in steam turbine and able to draw velocity diagrams of steam turbine blades to analyze the angles of the blades, work done, thrust, power, efficiencies of turbine.
CO5	Explain, classify the steam condensers, cooling towers and evaluate performance parameters of surface condenser.

SYLLABUS	
Contents	No. of hours
Unit I Introduction to layout of thermal power plant, Principle of steam generation, necessity of water treatment, Classification of steam generators (i.e. Boilers), comparison of fire tube & water tube boilers, high pressure boilers, boiler mountings and accessories. Performance of steam generators: Evaporation capacity, equivalent evaporation, boiler efficiency and preparation of Heat balance sheet of boiler.	08
Unit II Draught and its classification, calculations for chimney height, chimney diameter & efficiency. Condition for maximum discharge. Fluidized bed boiler: Bubbling fluidized bed boilers, circulating fluidized bed boilers. (Elementary treatment expected) Coal handling systems and ash handling systems.	07
Unit III Steam nozzles: Adiabatic expansion in nozzles, maximum discharge, critical pressure ratio and effects of friction, calculation of throat, exit areas and exit velocity of nozzle, supersaturated flow, Wilson Line. Steam turbines: Working principle of steam turbines, classification of steam turbines, and comparison of impulse and reaction turbine, governing of steam turbines.	07
Unit IV Compounding of steam turbines, Energy losses in steam turbines, flow of steam through turbine blades, reheat factors, velocity diagrams, graphical and analytical methods, work done, thrust and power, dimensions and proportioning of the blades, steam turbine efficiencies, condition for maximum efficiencies. (Analytical Treatment on simple Impulse turbine, Reaction turbine and two stage impulse turbine is expected)	08
Unit V Steam condensers: Classification of condensers, quality and quantity of cooling water required, calculations for surface condenser, Dalton's law of partial pressure, sources of air leakages and air removal, air ejectors. Cooling towers: Natural draught and forced draught cooling towers, cooling ponds	07

References:

Text Books Recommended:

1. A Course in Power Plant Engineering, S.C. Arora S.Domkundwar & V.M. Domkundwar, Dhanpat Rai & Co Publications.
2. Thermal Engineering, P.L. Ballaney, Khanna Publications.
3. Thermal Engineering, R. K. Rajput, Laxmi publications.
4. Thermal Engineering, M.M. Rathode, TMH publication.
5. A Course in Thermal Engineering, Anand Domkundwar, C.P. Kothandaraman, S. Domkundwar, Dhanpat Rai & Co Publications.

.Reference Books Recommended:

1. Thermal Engineering, Mathur & Mehtra, Jain Brothers Publications, New Delhi.
2. Heat Engineering, V.P. Vasandani & D.S. Kumar, Metropolian Book Publishers.
3. Power Plant Engineering, A.K. Raja, Shrivastava and Dwivedi, New age International Publishers.
4. Fluidized Bed Combustion, S. Oka and E. Anthony, Marcel Dekker Inc.
5. Power Plant Engineering, M. M. EI- Wakil, McGraw Hill International.
6. Charles H Butler: Cogeneration" McGraw Hill.

RTM Nagpur University- Mechanical Engineering
B. Tech 5th Semester
Design of Machine Elements (BTME503T)
Syllabus (Theory)

Course Title (Subject)	Hours / Week			Credits	Maximum Marks			Exam Duration (Hrs.)
	L	T	P		Continual Assessment	University Examination	Total	
Design of Machine Elements	3	1	-	4	30	70	100	3

Course Objective
The objective of this course is–

To study the basic principles of mechanical components design based on strength and rigidity using design data, various standards, codes, etc. and prepare component drawings.

Course Outcomes

Successful completion of this course the student will be able to:

Apply principals of static loading for design of Cotter joint, Knuckle joint.

Design bolted, welded joints, power screws & pressure vessels.

Design the power transmission shaft & coupling.

Design components subjected to fatigue or fluctuating stresses. Also, will be able to apply principles for determining bending stresses for design of curved beams e.g. crane hook, C-Frame.

CO5 Design clutches, brakes and springs.

SYLLABUS	
Contents	No of hours
Unit I Mechanical Engineering Design, Design methods, Aesthetic and Ergonomics consideration in design, Material properties and their uses in design, Manufacturing consideration in design, Design consideration of casting and forging, Basic principle of Machine Design, Modes of failures, Factor of safety, Design stresses, Theories of failures (Selection in the process of designing), Standards, I.S. Codes, Preferred Series and Numbers **Design of Joints against static loads**: Cotter joint and Knuckle joint	10
Unit II Design of bolted and welded joints under axial and eccentric loading conditions. Design of power screw: Thread forms, multiple threaded screws, terminology of power screw, design of screw jack. Design of Cylinder & Pressure Vessels: Types of pressure vessel, stresses induced in pressure vessel, Lame's, Clavarino's and Bernie's equations. Design of cylindrical & spherical pressure vessels. Design of nut, bolt, gasket & covers for pressure vessel.	10
Unit III **Design of shaft** for power transmission, static and fatigue criteria for shaft design, ASME codes for shaft design, Design of keys. Design of rigid and flexible coupling.	10
Unit IV: **Design against fluctuating loads:** variables stresses, reversed, repeated, fluctuating stresses. Fatigue failure: static and fatigue stress concentration factors, Endurance limit- estimation of endurance limit, Design for finite and infinite life, Soderberg and Goodman design criteria, Fatigue design under combined stresses. **Curved Beams:** Assumptions made in the analysis of curved beams, Design of curved beams, bending stresses in curved beams, such as crane hook, C-frame, etc.	08
Unit V: **Design of clutches and brakes:** Single and multiple plate clutch, constant wear and constant pressure theory for plate clutches, Internal and external shoe brakes and band brakes. Introduction to disc brakes and its design concepts. **Design of Springs:** Spring material, Helical compression & tension springs under static and variable loads, Leaf spring, Laminated Springs.	10

Sr. No.	List of Tutorials
01	Numerical on Design against static loads: Cotter joint and Knuckle joint
02	Numerical on design of bolted and welded joints
03	Numerical on design of power screw
04	Numerical on design of Cylinder & Pressure Vessels
05	Numerical on design of shaft, keys and coupling
06	Numerical on design of coupling
07	Numerical on Design of clutches and brakes
08	Numerical on Design of springs under static and variable loads.

References:

Text Books Recommended:

1. Design of Machine Elements, B.D. Shiwalkar. Central Techno publications
2. Design of Machine Elements, V. B. Bhandari., McGraw Hill education.
3. Design of Machine Elements, Sharma & Purohit, PHI.
4. Design Data book, B.D. Shiwalkar, Central Techno publications.
5. Mechanical Engg. Design, Shigley J E, TMH.
6. Design Data Book, PSG.

Reference Books Recommended:

1. Mechanical Design Analysis, M. F. Spotts, Prentice-Hall.
2. Machine Component Design, Robert C. Juvinall, Kurt M. Marshele, Wiley.
3. Machine Design, Maleev& Hartman, CBS publishers.
4. Hand book of Machine Design, Shigley&Mischke, McGraw Hill.
5. Machine Design, Robert L.Norton, Pearson.

RTM Nagpur University- Mechanical Engineering
B.Tech 5th Semester
Industrial Economics & Management (BTME504T)
Syllabus (Theory)

Semester	Course Title (Subject)	Hours / Week			Credits	Maximum Marks			Exam Duration (Hrs.)
		L	T	P		Continual Assessment	University Examination	Total	
V	Industrial Economics & Management	3	-	-	3	30	70	100	3

Sr. No.	Course Objective The objective of this course is–
01	This course is designed to familiarize the learners with important economic terminologies and key industrial concepts and to create awareness about functions of Industrial management and the concept of marketing and financial management.

Course Outcomes	
After successful completion of this course the student will be able to:	
CO1	Understand the concept of demand and supply and its relationship with the price
CO2	Relate various factors of production with reference to different economic sectors
CO3	Analyze the causes and effects of inflation and understand the market structure
CO4	Acquire knowledge of various functions of management and marketing management
CO5	Perceive the concept of financial management for the growth of business

SYLLABUS	
Contents	No of hours
Unit I Industrial Economics: Law of demand, Demand analysis, Types of demand, Determinants of demand, Supply, Law of diminishing marginal utility, Elasticity of demand, Types of elasticity of demand.	08
Unit II Factors of production, Firm and Industry, Law of return, Cost concepts, Fixed variable, Average, Marginal and Total cost, Depreciation and methods for depreciation, direct and indirect taxes	08
Unit III Inflation, effect of inflation, Monetary and fiscal measures to control inflation, deflation, Market and market structures, Perfect competition, Monopoly, Monopolistic competition, Oligopoly, Concept & overview of share market, Effect of share market on economy, Share market terminologies	08
Unit IV Definition, nature and scope of management, functions of management, Meaning and concepts of Marketing management, Marketing Mix, Channels of distribution, Advertising and sales promotion.	08
Unit V Meaning, nature and scope of financial management, Brief outline of profit and loss account, balance sheet, Budgets and their importance, Types of budgets- Rigid and flexible budgets.	08

Books Recommended:

Text Books

1. Modern Economics, H. L. Ahuja, S.Chand Publishers
2. Modern Economic Theory, K. K. Dewett., S. Chand Publishers
3. Engineering Economics, D. N. Dwivedi, A. Dwivedi, Vikas Publishing House
4. Industrial Management I.K. Chopde, A.M. Sheikh
5. Business Organization and Management S.A. Sherlekar

RTM Nagpur University- Mechanical Engineering
B.Tech 5th Semester
Mechanical Measurement and Metrology (BTME505T)
Syllabus (Theory)

Semester	Course Title (Subject)	Hours / Week			Credits	Maximum Marks			Exam Duration (Hrs.)
		L	T	P		Continual Assessment	University Examination	Total	
V	Mechanical Measurement and Metrology	3	-	-	3	30	70	100	3

Sr. No.	Course Objective The objective of this course is–
1	This course is designed to learn and understand need of measurements and static characteristics of instruments
2	It will help the students to system with time domain to identify the response time.
3	To impart the knowledge about the functioning of instrumentation and measurement process.
4	It aims to perform the assessment of production design and calculation.
5	It provides a basic knowledge metrological measurement.

Course Outcomes

After successful completion of this course the student will be able to:

CO1	Students will be able to analyze statistical characteristic of systems.
CO2	Students will be able asses the system response.
CO3	Students will be able to understand the instrumentation process.
CO4	Students will be able to understand limits fits and tolerance.
CO5	Students will learn the basics of various metrology measurement terms and techniques.

SYLLABUS	
Contents	No of hours
Unit I **Static Characteristics** Purpose, structure and elements of measuring system. Static characteristics of measurement system, elements including systematic, statistical characteristics, generalized model of system elements and calibration. Error measurement (Analytical Treatments is expected)	07
Unit II **Dynamic characteristics** of measurement system. Dynamic Characteristics, standard test inputs, order of system, dynamic analysis, system response to first and second order system using step and ramp input, time domain response. Introduction to noise in measurement system ([illegible]).	07
Unit III Construction, Range and working of instruments for measurement of Linear and Angular Displacement, Speed, Load, Strain, Force, Torque and Power. (Analytical treatment not included) Construction, Range and working of instruments for measurement of Pressure, Vacuum, Sound, Light and Temperature.(Analytical treatment not included)	07
Unit IV **Standards of Measurement**, Line, End and Wavelength standard. Working standards, Requirement interchangeability, Allowance and Tolerance, Selective assembly. **Limits and Fits**, Tolerance analysis of Limits and Fits, Types of limit gauges, Types of fit, Shaft and Hole basis system, Design of Limit gauge (Analytical treatment is expected) and Introduction to Process planning sheet	07
Unit V **Measurement of Straightness and of Flatness**. Instruments for Linear and Angular Measurement. (Vernier, Angle gauge, Sine bar, Level indicator, Clinometers and Taper gauge) **Comparators:** Mechanical, Optical, Electrical, Electronic, Pneumatic. Study and use of Optical profile projectors, Tool maker's microscope and Autocollimator.	07

Books Recommended

TEXT BOOKS:

1. Mechanical Measurement and Control, D.S. Kumar, Metropolitan Book Co.
2. Instrumentation Measurement and Analysis, B.C. Nakra, K.K. Choudhary, TMH
3. Measurement Systems, Ernest O. Doebelin, Dhanesh N. Manik, TMH
4. Mechanical Measurement, Thomas G. Beckwith, Pearson.
5. Metrology and Measurement, Anand K. Bewoor, Vinay A. Kulkarni, TMH
6. Metrology, R. K. Jain, Khanna Publishers.
7. A Textbook of Engineering Metrology, I. C. Gupta, Dhanpat Rai & Sons Publication.

REFERENCE BOOKS:

Principles of Measurement Systems, John P. Bentley, Pearson

RTM Nagpur University- Mechanical Engineering
B.Tech 5th Semester
Mechanical Measurement and Metrology Lab (BTME505P)
Syllabus (Practical)

Semester	Course Title(Subject)	Hours / Week			Credits	Maximum Marks		
		L	T	P		Continual Assessment	University Examination	Total
V	Mechanical Measurement and Metrology Lab	-	-	2	1	25	25	50

Course Outcomes	
After successful completion of this course the student will be able to:	
CO1	Students will be able to perform the instrumentation.
CO2	Students will be able to use the instrumentation for measurement of thermal properties.
CO3	Students will be able obtain the response from the instruments also can be able to calibrate the instruments.
CO4	Students will be able to calculate the limits and allowances to obtain the proper fit.
CO5	Students will able to identify the surface roughness using optical flat.

List of Practical's

Sr. No.	List of Practical's - Mechanical Measurement and Metrology
01	Static characteristic of at least one Instrument.
02	Static calibration of at least one Instrument.
03	3, 4 & 5. – Measurement of parameters by minimum three different types of Instruments
04	Measurement of Linear, Angular dimensions (Using Vernier, Sine bar, Clinometers)
05	Measurement of Flatness & Straightness.
06	Study and Measurement of Parameters using Toolmaker's microscope
07	Study and Measurement of Parameters using Optical profile projector
08	Use of Optical flat
09	Design of Limit gauge

Minimum Eight out of the following shall be performed.

RTM Nagpur University- Mechanical Engineering
B.Tech 5th Semester
Industrial Visit (BTME506P)
Syllabus (Practical)

Semester	Course Title (Subject)	Hours / Week			Credits	Maximum Marks			Exam Duration (Hrs.)
		L	T	P		Continual Assessment	University Examination	Total	
V	Industrial Visit	-	-	2	1	50	-	50	-

Sr. No.	Course Objective The objective of this course is–
1	Industrial visits provide the students with an opportunity to learn practically through interaction, working methods and employment practices. It gives the students an exposure to current work practices as opposed to theoretical knowledge being taught at their college classrooms

Course Outcomes	
After the successful completion of this course the students are able to:	
CO1	Opportunity to interact with Industry Experts.
CO2	Learning experience.
CO3	Enhanced employability and PPO's.
CO4	Interpersonal skills enhancement.
CO5	Acquire in depth knowledge about industries & innovative technologies employed.

Contents

- A student pursuing a certain degree will be taken to companies or industries related to their field for a visit and there the students will be exposed briefly to the procedures, processes, work environment, management efforts taking place in that industry.

- Students should meet industry leaders, professionals, entrepreneurs, policy makers, and corporates who share their wisdom, learning, and experiences. Through these interactions students should develop leadership qualities, management skills, and learn about the industry working.

- Industry interaction can be helpful in updating the curriculum when there are significant changes in prevalent technologies; also, the faculty members get to know about the industry's latest trends.
- Educational tours to industries provide an opportunity for students to see and experience real workstations, plants, machines, systems, assembly lines, and interact with highly trained andexperienced personnel. Students should present a report on the industry he/she visits.

- For students, such trips open many doors for corporate training and internships, which in turn increase the students' employability.

- During the industrial visits, the students get an opportunity to experience how professionals live, learn about various management concepts like Just In Time or Lean manufacturing and how theyare put into action. It is not easy to manage hundreds of skilled and unskilled workers at the same time and meet the stringent quality norms and production targets of the company. How managers, production engineers, employees work in tandem to achieve a common target is a management lesson in itself. Students are supposed to understand them.

- Industrial trips help students to enhance their interpersonal, communication skills, and teamworkabilities. These visits have, time and again, proved to be an excellent platform for networking as the students interact and connect with the corporates via official social media platforms like Facebook, Linked In, and Twitter. These educational/ industrial trips also help the students identify their learning towards a branch and decide their future work areas like marketing, finance, operations, IT, HR, etc.

Checklist

For Teachers:

1. Have you given the student some background about the organization?
2. Have you clearly defined the learning objectives to the organization and the students?
3. Have you ensured the plan for the day with the students and the learning procedure includingthe timings?
4. Have you elaborated the risk assessments to the students and the safety procedure along withthe behavior to be followed?
5. Have you ensured the permission from the Parents and the Guardians regarding the visit?
6. Prepared the students on the personal objectives?
7. Have you helped students form questions to be asked in the industry?
8. Have you introduced the students to the scientific topics that they will encounter on the visit?

Checklist for Students:

1. How conducive is the working environment
2. What type of organization is this?
3. Hierarchical structure in the organization
4. Products handled
5. Where is the workplace located?
6. How are the desks arranged?
7. Is it an open office or a closed office?
8. What is the noise level in this industry or factory?
9. What are the staff benefits?
10. Do the employees appear happy and engaged?
11. What are the age level and the gender balance?
12. What are the various departments and the varied availabilities?
13. Commutation mode to employees?

14. Are the employees challenged by their work?
15. What is the company culture followed?
16. The dress code maintained by the employees of both the genders?
17. Could you see yourself as a prospective employee of the company in the future?
18. Does this sector of education fascinate you?

Checklist for Organizing Team:

- Ensure that the college and the company are well aware of the Number of students', their age.
- Purpose of the visit is made clear to both the parties and MOU is signed by the company and theschool to comply with the rules of the organizing team.
- Do you understand the learning outcomes for the students and have a clear idea of how the visit willmeet these?
- Have you carried out a risk assessment and undertaken any other health and safety responsibilities
- Have you got a clear understanding of the plan for the day and the timings of activities?

NOTE

1. Students FEEDBACK form and Report must be collected and kept for reference during committeevisits.

2. A detailed report of all industries visited by the students must be prepared and kept for referenceduring committee visits.

3. Minimum 70% of total teaching staff should have visited at least one company with students

RTM Nagpur University- Mechanical Engineering
B.Tech 5th Semester
Performing Art (BTME507P)
Mandatory Course
Syllabus (Practical)

Semester	Course Title (Subject)	Hours / Week			Credits	Maximum Marks			Exam Duration (Hrs.)
		L	T	P		Continual Assessment	University Examination	Total	
V	**Performing Art**	-	-	2	Audit (0)	-	-	-	-

Sr. No.	Course Objective The objective of this course is–
1	A short course in art is at the heart of this course and is intended to open the way for students to "think outside the square" – or more precisely, through art to find themselves in that challenging but potentially wonderful place outside their own personal square.

Course Outcomes

- Empower the students in problem solving skills.
- The ability to analyze things and communicate them in the right way is taught.
- These skills are very much essential to get employed in reputed companies and most of the companies prefer candidates with the mentioned skills.
- It helps in selecting future options.

Performing Art –Suggested Activities. However Institutes are free to design their owncourse as per their convenience

LEVEL-1

Music	Dance	Drama
1. Raga studies	1. History of Dance	1. Acting
2. Western music	2. Choreography	2. Basic vocal practice
3. Hindustani music	3. New media	3. Communication skills
4. Study of Tala	4. Performance Practice	4. Yoga
5. Shastra	5. Indian Culture	5. Direction
6. Rabindra sangeet	6. Techniques of Dance	6. Event management
7. Folk music	7. Movement Techniques	7. Computer skills
8. World music	8. Dance on Camera	8. Indian theatre
		9. History of theatre
		10. Western theatre
		11. Camera, light, sound
		12. Filming concepts
		13. Projects on short films
		14. TV production
		15. Film Theories

LEVEL-2

Music	Dance	Drama
1. Analytical study of raga 2. Raga classification system 3. Indian aesthetics 4. Comparative aesthetics 5. A critical study of specified raga 6. Composition forms of Indian vocal music	1. History of dance 2. Dance and sculpture 3. Kathak 4. Bharatnatyam 5. Rasa & Nayak Nayika Bheda 6. Traditional folk dance 7. Dance and Sanskrit treaties	1. Theatre game & physical exercises 2. Voice speech 3. Acting on stage 4. Play production 5. Classical Indian theatre 6. Direction zones 7. Stage management 8. Acting on camera 9. TV and film production 10. Children's theatre 11. Folk performances 12. Play production 13. Improvisation, Mime and choreography