

JAWAHARLAL DARDA INSTITUTE OF ENGINEERING & TECHNOLOGY, YAVATMAL

Department of chemical Engineering

SUMMARY SHEET

CO ATTAINMENT FOR 3 YEARS

SESSION 2014-15

CO	TITLE	LEVEL	%ATTENMENT
MATHEMATICS -III			
CO301.1	Students' expertise in solving numerical methods, Laplace transforms, Fourier Transform & Z-transform.	2.6	87%
CO301.2	Probability & probability Distribution and statistics are very useful.	2.4	80%
CO301.3	Complex functions & vector calculus are backbone of future academics.	3	100%
CO301.4	Applications of Numerical Analysis in further academics.	3	100%
CO301.5	Laplace transform can be applied to further academics	3	100%
CO301.6	Mathematical abilities help to solve chemical engineering numericals	3	100%
PROCESS INSTRUMENTATION			
CO302.1	Students will get the knowledge about the instrumentation field	2.2	73%
CO302.2	Understands the operating principles, construction & working of temperature, pressure, level and flow measuring devices.	2.2	73%
CO302.3	Student will get the knowledge about static & dynamic characteristics of instrument	2.2	73%
CO302.4	Student will get the basic knowledge of method of measurements.	2.2	73%
CO302.5	Ability of selecting the most suitable measuring device based on its performance characteristics	2.2	73%
CO302.6	Ability of calibrating and maintaining measuring device elements	2.2	73%
STRENGTH OF MATERIAL			
CO303.1	Ability to understand the mechanical properties of materials	2.6	87%
CO303.2	Student will get the knowledge of different forces acting and bending theory on materials.	2.4	80%
CO303.3	Student will get the knowledge of different forces acting and bending theory on materials.	3	100%
CO303.4	Ability to understand the strength of materials subjected to internal pressures	3	100%
CO303.5	Student will get the knowledge of strain energy and principal stresses	3	100%
CO303.6	Student will get the knowledge of deflection of the beams	3	100%
CHEMICAL ENGG. THERMODYNAMICS -I			
CO 304.1	Ability to apply fundamental concepts of thermodynamics to engineering applications.	2.2	73%
CO 304.2	Ability to estimate thermodynamic properties of substances in gas and liquid states	2.2	73%
CO 304.3	Capability to determine thermodynamic efficiency of various energy related processes	2.2	73%
CO 304.4	Applied to design the chemical engineering equipments in processes.	2.2	73%
CO 304.5	Ability of application of thermodynamics to phase equilibria and reaction equilibria.	2.2	73%
CO 304.6	Applies thermodynamics to conversion devices.	3	100%
PROCESS CALCULATIONS			
CO305.1	Ability to make material balances on unit operations and processes.	3	100%
CO305.2	Ability to perform simultaneous material and energy balances.	3	100%
CO305.3	Understanding of the degrees of freedom analysis and its significance.	3	100%
CO 305.4	Understanding of the concept of humidity and usage of psychrometric chart.	3	100%
CO 305.5	Develops the systematic problem solving skills.	3	100%
CO 305.6	Develops the capability of application of laws to different proportions	0.6	20%
FLUID FLOW OPERATIONS			
CO 401.1	Knowledge of basic principles of fluid mechanics	0.6	20%
CO 401.2	Ability to analyze fluid flow problems with the application of the momentum and energy equations	0.6	20%
CO 401.3	Capability to analyze pipe flows as well as fluid machinery.	0.6	20%
CO 401.4	Understands the working & principle of different flow meters	0.6	20%
CO 401.5	Understands the working & principle of different pumps.	0.2	7%
CO401.6	Understands the concepts of two-phase flow.	0.6	20%
CHEMICAL ENGG. THERMODYNAMICS -II			
CO 402.1	Ability to apply fundamental concepts of thermodynamics to engineering applications.	0.6	20%
CO 402.2	Ability of application of thermodynamics to phase equilibria and reaction equilibria	0.6	20%
CO 402.3	Applies thermodynamics to conversion devices.	0.6	20%
CO 402.4	Applied to design the chemical engineering equipments in processes	0.4	13%
CO402.5	Capability to determine thermodynamic efficiency of various energy related processes	0.6	20%
CO 402.6	Ability to estimate thermodynamic properties of substances in gas and liquid states.	0.6	20%
MACHINE DESIGN AND DRAWING			
CO 403.1	Student will be able to identify & calculate different forces & stresses induced in the machine parts like gears, I C engine parts, couplings, pr vessels etc.	0.6	20%
CO 403.2	Student will be able to choose appropriate functions for different service conditions	0.6	20%
CO 403.3	Student will be able to explain and formulate different optimization techniques	0.6	20%
CO 403.4	Student will be able to design various mechanical components e.g. belt, rope, chain, gears, C engine parts, couplings, pressure vessels etc	0.6	20%
CO 403.5	Student will be able to understand the different types of joints.	0.6	20%
CO 403.6	Student will get knowledge of the machine design & drawing.	0.6	20%
APPLIED PHYSICAL CHEMISTRY			
CO 404.1	Student gets knowledge of the thermodynamic properties of ideal and real solutions for the determination of the ions.	0.6	0.2
CO 404.2	Ability to understand kinetic theory of the gases	0.6	0.2
CO 404.3	Ability to understand radiation chemistry and spectroscopy	0.6	0.2
CO 404.4	Ability to understand surface phenomena and catalysis	0.6	0.2
CO 404.5	Ability to understand chemical equilibrium and kinetics	0.6	0.2
CO 404.6	Ability to understand laws of thermodynamics	0.6	0.2
MECHANICAL OPERATIONS			
CO 405.1	Ability to understand fluid particle systems and equipment	0.6	20%
CO 405.2	Ability to select suitable size reduction equipment, solid-solid separation method and conveying system	0.6	20%

CO 405.3	Ability to understand physical properties used for purification	0.6	20%
CO 405.4	Understanding of fluid flow through packed and fluidized beds	0.6	20%
CO 405.5	Ability to select different solid fluid separation equipments	0.6	20%
CO 405.6	Ability to analyze mixing processes using different types of mixers	1.4	47%
HEAT TRANSFER			
CO 501.1	The concepts of heat transfer	1.4	47%
CO 502.2	Understands mechanisms of conduction, convection and radiation	1.4	47%
CO 503.3	The heat transfer in parallel & counter current flow	1.4	47%
CO 504.4	Analyzes the performance of heat exchange equipments & evaporators.	1.4	47%
CO 505.5	The effect of heat transfer in boiling and evaporators	1.4	47%
CO 506.6	The components subjected to thermal loading	0.6	20%
CHEMICAL ENGINEERING PROCESS-I			
CO 502.1	Importance and components of chemical engineering.	0.6	20%
CO 502.2	Concepts of unit operations and unit processes	0.6	20%
CO 502.3	Knows current scenario of chemical & allied process industries	0.6	20%
CO 502.4	Understands the manufacturing of various inorganic chemicals	0.6	20%
CO 502.5	Understands the process flow diagram and various process parameters	0.6	20%
CO 502.6	Identifies and solve engineering problems during production.	0.6	20%
ECONOMICS AND MANAGEMENT			
CO 503.1	Understands the happenings in the field of economics & preliminary idea about management.	0.6	20%
CO 503.2	Performs & evaluate of present worth, future worth & annual worth analyses on one or more economic alternatives	0.6	20%
CO 503.3	Performs & evaluate payback period & capitalized cost on one or more economic alternatives	0.6	20%
CO 503.4	Carries out & evaluates benefit/cost, life cycle & break even analyses on one or more economic alternatives	0.6	20%
CO 503.5	Makes economic analyses in the decision making process to justify or reject alternative/projects on economic basis	0.6	20%
CO 503.6	Social awareness & Marketing strategy related to economics is evaluated.	3	100%
MATERIAL SCIENCE & ENGINEERING			
CO 504.1	Understands the atomic, molecular, crystalline & microscopic structures of engineering materials.	3	100%
CO 504.2	Predicts and controls material properties	3	100%
CO 504.3	Develops the techniques, skills, and modern engineering tools necessary for engineering practice	3	100%
CO 504.4	Makes understand the different corrosion types and properties	3	100%
CO 504.5	Helps to select the polymeric materials for equipments	3	100%
CO 504.6	Understand the basic issues involved in polymer blends, composites and nanocomposites.	3	100%
COMMUNICATION SKILL			
CO 505.1	Knows the sources, characteristics & effects of air pollution on living and non-living things	3	100%
CO 505.2	Understand the atmospheric dispersion of air pollutants.	3	100%
CO 505.3	Meteorological factors affecting the air pollution	3	100%
CO 505.4	Theory and development of pollution control devices	3	100%
CO 505.5	Understand environmental regulatory legislations and standards	3	100%
CO 505.6	Principles & standards of air sampling	3	100%
MASS TRANSFER-I			
CO 601.1	Students will learn about the diffusional mass transfer	1.4	47%
CO 601.2	Interphase and different analogies of mass transfer	1.4	47%
CO 601.3	Student will understand the mechanism of crystallization and absorption	1.4	47%
CO 601.4	Operation of Drying will be understood.	1.4	47%
CO 601.5	Design and operation of the equipments can be understood	1.4	47%
CO 601.6	Recent developments in mass transfer operation.	1.4	47%
CHEMICAL ENGINEERING PROCESS-II			
CO 602.1	Importance and components of chemical engineering.	1.4	47%
CO 602.2	Concepts of unit operations and unit processes.	1.4	47%
CO 602.3	Understands the manufacturing of various organic chemicals	1.4	47%
CO 602.4	Understands the process flow diagram and various process parameters	1.4	47%
CO 602.5	Identifies and solve engineering problems during production	1.4	47%
CO 602.6	Knows current scenario of chemical & allied process industries.	1.4	47%
COMPUTER PROGRAMMING & APPLICATIONS			
CO 603.1	Finds the numerical solution of first order differential equation	1.4	47%
CO 603.2	Finds the solutions to linear equations using different methods.	1.4	47%
CO 603.3	Finds the roots of the equation by Newton-Raphson method	1.4	47%
CO 603.4	Designs algorithm for regression.	1.4	47%
CO 603.5	Understands the elements of optimization techniques	1.2	40%
CO 603.6	Design programs involving decision structures, loops and functions.	1.2	40%
PLANT EQUIPMENT DESIGN AND DRAWING			
CO 604.1	Knowledge of basics of process equipment design and important parameters of equipment design.	0.6	20%
CO 604.2	Knowledge of process equipment accessories & support systems	0.6	20%
CO 604.3	Ability to design pressure vessels subjected to internal and external pressures	0.6	20%
CO 604.4	Ability to design special vessels (e.g. tall vessels) and various parts of vessels (e.g. heads).	0.6	20%
CO 604.5	Knowledge of equipment fabrication and testing methods	0.6	20%
CO 604.6	Designs of the piping system.	0.6	20%
NON-CONVENTIONAL ENERGY SOURCES			
CO 605.1	Knows the energy demand of world, nation and available resources to fulfill the demand.	2.2	73%
CO 605.2	Knows current scenario of renewable energy sources	2.2	73%
CO 605.3	Knows about the exploration of nonconventional energy resources and their effective tapping technologies.	2.2	73%
CO 605.4	Understands the basic principles, unit operations and unit processes.	2.2	73%
CO 605.5	Effective utilization of available renewable energy resources.	2.2	73%
CO 605.6	Acquires the knowledge of modern energy conversion technologies	2.2	73%
MASS TRANSFER-II			
CO701.1	Separation by liquid- liquid Extraction	3	100%
CO701.2	Separation by leaching	3	100%

CO701.3	Design calculation of distillation column	3	100%
CO701.4	Design calculation of multi component distillation column	3	100%
CO701.5	Design and operation of the equipments can be understood.	3	100%
CO701.6	Recent developments in mass transfer operation.	3	100%
CHEMICAL REACTION ENGINEERING-I			
CO702.1	Develop rate laws for homogeneous reactions.	0.6	20%
CO702.2	Design of ideal reactors for single and complex reactions.	0.6	20%
CO702.3	Develop skills to choose the right reactor among single, multiple, recycle reactor, etc.	0.4	13%
CO702.4	Design of multiple reactor system	0.4	13%
CO702.5	Design of non-isothermal reactors.	0.4	13%
CO702.6	Design of recycle reactors.	0.4	13%
PROCESS DYNAMICS & CONTROL			
CO703.1	Students will be able to model a physical process.	3	20%
CO703.2	Students will have the knowledge of various controller designs, and methods of controller tuning	3	20%
CO703.3	Understands the advanced control techniques.	3	13%
CO703.4	Students will be exposed to various complex control schemes, characteristics and application of control valves.	3	13%
CO703.5	Understands the frequency response methods.	3	13%
CO703.6	Understands the dynamics and control of chemical equipments	3	13%
INDUSTRIAL WASTE TREATMENT			
CO704.1	Understand the different types of wastes generated in an industry,	1.4	47%
CO704.2	Understand the different unit operations and unit processes involved in conversion of	1.4	47%
CO704.3	Understand about the quantification and analysis of wastewater and treatment.	1.4	47%
CO704.4	Understand the disposal of water pollutants, and operating principles of control devices	1.4	47%
CO704.5	Understand advanced waste water treatment processes	1.4	47%
CO704.6	Understand environmental regulatory legislations and standards and climate changes.	1.4	47%
PLANT DESIGN AND PROJECT ENGINEERING			
CO705.1	Understand concepts of plant design and project engineering	3	100%
CO705.2	Synthesize feasible and optimum flow-sheet.	3	100%
CO705.3	Estimation of capital investment, total product costs, and profitability.	3	100%
CO705.4	Optimum design of equipments based on economics and process considerations.	3	100%
CO705.5	Understands the replacement and maintenance analysis	3	100%
CO705.6	Understands inventory control and project management	3	100%
TRANSPORT PHENOMENA			
CO801.1	Understanding of transport processes.	2.2	100%
CO801.2	Understands mass, momentum and energy balance equations	2.2	100%
CO801.3	Ability to analyze industrial problems along with appropriate boundary conditions	2.2	100%
CO801.4	Understands the boundary layer and its equations.	2.2	100%
CO801.5	Ability to do heat, mass and momentum transfer analysis.	2.2	100%
CO801.6	Understands the mass transfer analogies.	2.2	100%
CHEMICAL REACTION ENGINEERING-II			
CO802.1	Ability to distinguish between various RTD curves and predict the conversion from a non-ideal reactor using tracer information.	1.4	47%
CO802.2	Develop rate laws for heterogeneous reactions.	1.4	47%
CO802.3	Understands the adsorption phenomena	1.4	47%
CO802.4	Design of reactors for non-catalytic and catalytic reactions.	1.4	47%
CO802.5	Design of towers for gas-liquid operations with and without chemical reaction.	1.4	47%
CO802.6	Designs different reactors.	1.4	47%
SYSTEM MODELLING			
CO803.1	Understand the important physical phenomena from the problem statement	3	47%
CO803.2	Develop model equations for the given system	3	47%
CO803.3	Demonstrate the model solving ability for various processes/unit operations	3	47%
CO803.4	Demonstrate the ability to use a process simulation	3	47%
CO803.5	Ability to solve problems by using least square analysis.	3	47%
CO803.6	Understand Correlation and Regression	3	47%
PROCESS CHEMICAL TECHNOLOGY			
CO804.1	Introduction with the petroleum refinery worldwide	3	100%
CO804.2	Develop knowledge of different refining processes	3	100%
CO804.3	Develop knowledge of safety and pollution control in the refining industries	3	100%
CO804.4	To find the suitable refining technology for maximizing the gasoline yield	3	100%
CO804.5	Understanding of various catalytic conversion processes	3	100%
CO804.6	Understands different finishing and lube oil manufacturing process.	3	100%

CO ATTAINMENT FOR 2015-16

CO	TITLE	LEVAL	%ATTENMENT
MATHEMATICS -III			
CO301.1	Students' expertise in solving numerical methods. Laplace transforms, Fourier Transform & Z-transform.	2.2	73%
CO301.2	Probability & probability Distribution and statistics are very useful.	2	67%
CO301.3	Complex functions & vector calculus are backbone of future academics.	1.6	53%
CO301.4	Applications of Numerical Analysis in further academics.	2	67%
CO301.5	Laplace transform can be applied to further academics	1.6	53%
CO301.6	Mathematical abilities help to solve chemical engineering numerals	2.2	73%
PROCESS INSTRUMENTATION			

CO302.1	Students will get the knowledge about the instrumentation field	3	100%
CO302.2	Understands the operating principles, construction & working of temperature, pressure, level and flow measuring devices.	3	100%
CO302.3	Student will get the knowledge about static & dynamic characteristics of instrument	1.8	60%
CO302.4	Student will get the basic knowledge of method of measurements.	1.6	53%
CO302.5	Ability of selecting the most suitable measuring device based on its performance characteristics	3	100%
CO302.6	Ability of calibrating and maintaining measuring device elements	3	100%
STRENGTH OF MATERIAL			
CO303.1	Ability to understand the mechanical properties of materials	3	100%
CO303.2	Student will get the knowledge of different forces acting and bending theory on materials.	3	100%
CO303.3	Student will get the knowledge of different forces acting and bending theory on materials.	2	67%
CO303.4	Ability to understand the strength of materials subjected to internal pressures	3	100%
CO303.5	Student will get the knowledge of strain energy and principal stresses	3	100%
CO303.6	Student will get the knowledge of deflection of the beams	3	100%
CHEMICAL ENGG. THERMODYNAMICS -I			
CO 304.1	Ability to apply fundamental concepts of thermodynamics to engineering applications.	1.4	47%
CO 304.2	Ability to estimate thermodynamic properties of substances in gas and liquid states	1.4	47%
CO 304.3	Capability to determine thermodynamic efficiency of various energy related processes	1.4	47%
CO 304.4	Applied to design the chemical engineering equipments in processes.	1.4	47%
CO 304.5	Ability of application of thermodynamics to phase equilibria and reaction equilibria.	1.4	47%
CO 304.6	Applies thermodynamics to conversion devices.	1.2	40%
PROCESS CALCULATIONS			
CO305.1	Ability to make material balances on unit operations and processes.	3	100%
CO305.2	Ability to perform simultaneous material and energy balances.	3	100%
CO305.3	Understanding of the degrees of freedom analysis and its significance.	3	100%
CO 305.4	Understanding of the concept of humidity and usage of psychrometric chart.	3	100%
CO 305.5	Develops the systematic problem solving skills.	3	100%
CO 305.6	Develops the capability of application of laws to different proportions	3	100%
FLUID FLOW OPERATIONS			
CO 401.1	Knowledge of basic principles of fluid mechanics	3	100%
CO 401.2	Ability to analyze fluid flow problems with the application of the momentum and energy equations	3	100%
CO 401.3	Capability to analyze pipe flows as well as fluid machinery.	3	100%
CO 401.4	Understands the working & principle of different flow meters	3	100%
CO 401.5	Understands the working & principle of different pumps.	2.4	80%
CO401.6	Understands the concepts of two-phase flow.	3	100%
CHEMICAL ENGG. THERMODYNAMICS -II			
CO 402.1	Ability to apply fundamental concepts of thermodynamics to engineering applications.	0.3	10%
CO 402.2	Ability of application of thermodynamics to phase equilibria and reaction equilibria	0.3	10%
CO 402.3	Applies thermodynamics to conversion devices.	2	67%
CO 402.4	Applied to design the chemical engineering equipments in processes	2	67%
CO402.5	Capability to determine thermodynamic efficiency of various energy related processes	0.6	20%
CO 402.6	Ability to estimate thermodynamic properties of substances in gas and liquid states.	0.6	20%
MACHINE DESIGN AND DRAWING			
CO 403.1	Student will be able to identify & calculate different forces & stresses induced in the machine parts like gears, I C engine parts, couplings, pr vessels etc.	1.4	47%
CO 403.2	Student will be able to choose appropriate functions for different service conditions	1.4	47%
CO 403.3	Student will be able to explain and formulate different optimization techniques	1.3	43%
CO 403.4	Student will be able to design various mechanical components e.g. belt, rope, chain, gears, C engine parts, couplings, pressure vessels etc	1.3	43%
CO 403.5	Student will be able to understand the different types of joints.	1.4	47%
CO 403.6	Student will get knowledge of the machine design & drawing.	1.4	47%
APPLIED PHYSICAL CHEMISTRY			
CO 404.1	Student gets knowledge of the thermodynamic properties of ideal and real solutions for the determination of the ions.	2.8	93%
CO 404.2	Ability to understand kinetic theory of the gases	2.4	80%
CO 404.3	Ability to understand radiation chemistry and spectroscopy	2.8	93%
CO 404.4	Ability to understand surface phenomena and catalysis	2.6	87%
CO 404.5	Ability to understand chemical equilibrium and kinetics	2.4	80%
CO 404.6	Ability to understand laws of thermodynamics	2.4	80%
MECHANICAL OPERATIONS			
CO 405.1	Ability to understand fluid particle systems and equipment	2.2	73%
CO 405.2	Ability to select suitable size reduction equipment, solid-solid separation method and conveying system	2.2	73%
CO 405.3	Ability to understand physical properties used for purification	2.2	73%
CO 405.4	Understanding of fluid flow through packed and fluidized beds	2.2	73%
CO 405.5	Ability to select different solid fluid separation equipments	2.2	73%
CO 405.6	Ability to analyze mixing processes using different types of mixers	2.2	73%
HEAT TRANSFER			
CO 501.1	The concepts of heat transfer	1.4	47%
CO 502.2	Understands mechanisms of conduction, convection and radiation	1.4	47%
CO 503.3	The heat transfer in parallel & counter current flow	1.4	47%
CO 504.4	Analyzes the performance of heat exchange equipments & evaporators.	1.4	47%
CO 505.5	The effect of heat transfer in boiling and evaporators	1.4	47%
CO 506.6	The components subjected to thermal loading	1.4	47%
CHEMICAL ENGINEERING PROCESS-I			
CO 502.1	Importance and components of chemical engineering.	0.6	20%
CO 502.2	Concepts of unit operations and unit processes	0.6	20%
CO 502.3	Knows current scenario of chemical & allied process industries	0.6	20%
CO 502.4	Understands the manufacturing of various inorganic chemicals	0.6	20%
CO 502.5	Understands the process flow diagram and various process parameters	0.6	20%
CO 502.6	Identifies and solve engineering problems during production.	0.6	20%

ECONOMICS AND MANAGEMENT			
CO 503.1	Understands the happenings in the field of economics & preliminary idea about management.	3	100%
CO 503.2	Performs & evaluate of present worth, future worth & annual worth analyses on one or more economic alternatives	3	100%
CO 503.3	Performs & evaluate payback period & capitalized cost on one or more economic alternatives	3	100%
CO 503.4	Carries out & evaluates benefit/cost, life cycle & break even analyses on one or more economic alternatives	3	100%
CO 503.5	Makes economic analyses in the decision making process to justify or reject alternative/projects on economic basis	3	100%
CO 503.6	Social awareness & Marketing strategy related to economics is evaluated.	3	100%
MATERIAL SCIENCE & ENGINEERING			
CO 504.1	Understands the atomic, molecular, crystalline & microscopic structures of engineering materials.	3	100%
CO 504.2	Predicts and controls material properties	3	100%
CO 504.3	Develops the techniques, skills, and modern engineering tools necessary for engineering practice	3	100%
CO 504.4	Makes understand the different corrosion types and properties	3	100%
CO 504.5	Helps to select the polymeric materials for equipments	3	100%
CO 504.6	Understand the basic issues involved in polymer blends, composites and nanocomposites.	3	100%
COMMUNICATION SKILL			
CO 505.1	Knows the sources, characteristics & effects of air pollution on living and non-living things	3	100%
CO 505.2	Understand the atmospheric dispersion of air pollutants.	3	100%
CO 505.3	Meteorological factors affecting the air pollution	3	100%
CO 505.4	Theory and development of pollution control devices	3	100%
CO 505.5	Understand environmental regulatory legislations and standards	3	100%
CO 505.6	Principles & standards of air sampling	3	100%
MASS TRANSFER-I			
CO 601.1	Students will learn about the diffusional mass transfer	0.6	20%
CO 601.2	Interphase and different analogies of mass transfer	0.6	20%
CO 601.3	Student will understand the mechanism of crystallization and absorption	0.6	20%
CO 601.4	Operation of Drying will be understood.	0.6	20%
CO 601.5	Design and operation of the equipments can be understood	0.6	20%
CO 601.6	Recent developments in mass transfer operation.	0.6	20%
CHEMICAL ENGINEERING PROCESS-II			
CO 602.1	Importance and components of chemical engineering.	2	67%
CO 602.2	Concepts of unit operations and unit processes.	2	67%
CO 602.3	Understands the manufacturing of various organic chemicals	0.2	7%
CO 602.4	Understands the process flow diagram and various process parameters	0.2	7%
CO 602.5	Identifies and solve engineering problems during production	0.5	17%
CO 602.6	Knows current scenario of chemical & allied process industries.	0.5	17%
COMPUTER PROGRAMMING & APPLICATIONS			
CO 603.1	Finds the numerical solution of first order differential equation	3	100%
CO 603.2	Finds the solutions to linear equations using different methods.	3	100%
CO 603.3	Finds the roots of the equation by Newton-Raphson method	3	100%
CO 603.4	Designs algorithm for regression.	3	100%
CO 603.5	Understands the elements of optimization techniques	3	100%
CO 603.6	Design programs involving decision structures, loops and functions.	3	100%
PLANT EQUIPMENT DESIGN AND DRAWING			
CO 604.1	Knowledge of basics of process equipment design and important parameters of equipment design.	2.6	87%
CO 604.2	Knowledge of process equipment accessories & support systems	2.6	87%
CO 604.3	Ability to design pressure vessels subjected to internal and external pressures	2.6	87%
CO 604.4	Ability to design special vessels (e.g. tall vessels) and various parts of vessels (e.g. heads).	2.6	87%
CO 604.5	Knowledge of equipment fabrication and testing methods	2.6	87%
CO 604.6	Designs of the piping system.	2.6	87%
NON-CONVENTIONAL ENERGY SOURCES			
CO 605.1	Knows the energy demand of world, nation and available resources to fulfill the demand.	3	100%
CO 605.2	Knows current scenario of renewable energy sources	3	100%
CO 605.3	Knows about the exploration of nonconventional energy resources and their effective tapping technologies.	3	100%
CO 605.4	Understands the basic principles, unit operations and unit processes.	3	100%
CO 605.5	Effective utilization of available renewable energy resources.	3	100%
CO 605.6	Acquires the knowledge of modern energy conversion technologies	3	100%
MASS TRANSFER-II			
CO701.1	Separation by liquid- liquid Extraction	2.2	73%
CO701.2	Separation by leaching	2.2	73%
CO701.3	Design calculation of distillation column	2.2	73%
CO701.4	Design calculation of multi component distillation column	2.2	73%
CO701.5	Design and operation of the equipments can be understood.	1.8	60%
CO701.6	Recent developments in mass transfer operation.	1.8	60%
CHEMICAL REACTION ENGINEERING-I			
CO702.1	Develop rate laws for homogeneous reactions.	0.6	20%
CO702.2	Design of ideal reactors for single and complex reactions.	0.6	20%
CO702.3	Develop skills to choose the right reactor among single, multiple, recycle reactor, etc.	0.4	13%
CO702.4	Design of multiple reactor system	0.4	13%
CO702.5	Design of non-isothermal reactors.	0.4	13%
CO702.6	Design of recycle reactors.	0.4	13%
PROCESS DYNAMICS & CONTROL			
CO703.1	Students will be able to model a physical process.	3	100%
CO703.2	Students will have the knowledge of various controller designs, and methods of controller tuning	3	100%
CO703.3	Understands the advanced control techniques.	2.9	97%
CO703.4	Students will be exposed to various complex control schemes, characteristics and application of control valves.	3	100%
CO703.5	Understands the frequency response methods.	3	100%
CO703.6	Understands the dynamics and control of chemical equipments	3	100%

INDUSTRIAL WASTE TREATMENT			
CO704.1	Understand the different types of wastes generated in an industry.	3	100%
CO704.2	Understand the different unit operations and unit processes involved in conversion of	3	100%
CO704.3	Understand about the quantification and analysis of wastewater and treatment.	3	100%
CO704.4	Understand the disposal of water pollutants, and operating principles of control devices	3	100%
CO704.5	Understand advanced waste water treatment processes	3	100%
CO704.6	Understand environmental regulatory legislations and standards and climate changes.	3	100%
PLANT DESIGN AND PROJECT ENGINEERING			
CO705.1	Understand concepts of plant design and project engineering	3	100%
CO705.2	Synthesize feasible and optimum flow-sheet.	3	100%
CO705.3	Estimation of capital investment, total product costs, and profitability.	3	100%
CO705.4	Optimum design of equipments based on economics and process considerations.	3	100%
CO705.5	Understands the replacement and maintenance analysis	3	100%
CO705.6	Understands inventory control and project management	3	100%
TRANSPORT PHENOMENA			
CO801.1	Understanding of transport processes.	3	100%
CO801.2	Understands mass, momentum and energy balance equations	3	100%
CO801.3	Ability to analyze industrial problems along with appropriate boundary conditions	3	100%
CO801.4	Understands the boundary layer and its equations.	3	100%
CO801.5	Ability to do heat, mass and momentum transfer analysis.	3	100%
CO801.6	Understands the mass transfer analogies.	3	100%
CHEMICAL REACTION ENGINEERING-II			
CO802.1	Ability to distinguish between various RTD curves and predict the conversion from a non-ideal reactor using tracer information.	2.7	90%
CO802.2	Develop rate laws for heterogeneous reactions.	2.7	90%
CO802.3	Understands the adsorption phenomena	2.4	80%
CO802.4	Design of reactors for non-catalytic and catalytic reactions.	2.4	80%
CO802.5	Design of towers for gas-liquid operations with and without chemical reaction.	2.7	90%
CO802.6	Designs different reactors.	2.7	90%
SYSTEM MODELLING			
CO803.1	Understand the important physical phenomena from the problem statement	3	90%
CO803.2	Develop model equations for the given system	3	90%
CO803.3	Demonstrate the model solving ability for various processes/unit operations	3	80%
CO803.4	Demonstrate the ability to use a process simulation	3	80%
CO803.5	Ability to solve problems by using least square analysis.	3	90%
CO803.6	Understand Correlation and Regression	3	90%
PROCESS CHEMICAL TECHNOLOGY			
CO804.1	Introduction with the petroleum refinery worldwide	3	100%
CO804.2	Develop knowledge of different refining processes	3	100%
CO804.3	Develop knowledge of safety and pollution control in the refining industries	3	100%
CO804.4	To find the suitable refining technology for maximizing the gasoline yield	3	100%
CO804.5	Understanding of various catalytic conversion processes	3	100%
CO804.6	Understands different finishing and lube oil manufacturing process.	3	100%

CO ATTAINMENT FOR 2016-17

CO	TITLE	LEVEL	%ATTENMENT
MATHEMATICS -III			
CO301.1	Students' expertise in solving numerical methods, Laplace transforms, Fourier Transform & Z-transform.	0.4	13%
CO301.2	Probability & probability Distribution and statistics are very useful.	0.4	13%
CO301.3	Complex functions & vector calculus are backbone of future academics.	0.2	7%
CO301.4	Applications of Numerical Analysis in further academics.	0.2	7%
CO301.5	Laplace transform can be applied to further academics	0.6	20%
CO301.6	Mathematical abilities help to solve chemical engineering numericals	0.6	20%
PROCESS INSTRUMENTATION			
CO302.1	Students will get the knowledge about the instrumentation field	1.4	47%
CO302.2	Understands the operating principles, construction & working of temperature, pressure, level and flow measuring devices.	1.4	47%
CO302.3	Student will get the knowledge about static & dynamic characteristics of instrument	1	33%
CO302.4	Student will get the basic knowledge of method of measurements.	1	33%
CO302.5	Ability of selecting the most suitable measuring device based on its performance characteristics	1	33%
CO302.6	Ability of calibrating and maintaining measuring device elements	1	33%
STRENGTH OF MATERIAL			
CO303.1	Ability to understand the mechanical properties of materials	1.4	47%
CO303.2	Student will get the knowledge of different forces acting and bending theory on materials.	1	33%
CO303.3	Student will get the knowledge of different forces acting and bending theory on materials.	0.8	27%
CO303.4	Ability to understand the strength of materials subjected to internal pressures	0.8	27%
CO303.5	Student will get the knowledge of strain energy and principal stresses	0.8	27%
CO303.6	Student will get the knowledge of deflection of the beams	0.8	27%
CHEMICAL ENGG. THERMODYNAMICS -I			

CO 304.1	Ability to apply fundamental concepts of thermodynamics to engineering applications.	0.8	27%
CO 304.2	Ability to estimate thermodynamic properties of substances in gas and liquid states	0.8	27%
CO 304.3	Capability to determine thermodynamic efficiency of various energy related processes	0.8	27%
CO 304.4	Applied to design the chemical engineering equipments in processes.	0.8	27%
CO 304.5	Ability of application of thermodynamics to phase equilibria and reaction equilibria.	0.8	27%
CO 304.6	Applies thermodynamics to conversion devices.	0.8	27%
PROCESS CALCULATIONS			
CO305.1	Ability to make material balances on unit operations and processes.	0.6	20%
CO305.2	Ability to perform simultaneous material and energy balances.	0.6	20%
CO305.3	Understanding of the degrees of freedom analysis and its significance.	1.6	53%
CO 305.4	Understanding of the concept of humidity and usage of psychrometric chart.	1.6	53%
CO 305.5	Develops the systematic problem solving skills.	2.2	73%
CO 305.6	Develops the capability of application of laws to different proportions	1.6	53%
FLUID FLOW OPERATIONS			
CO 401.1	Knowledge of basic principles of fluid mechanics	3	100%
CO 401.2	Ability to analyze fluid flow problems with the application of the momentum and energy equations	3	100%
CO 401.3	Capability to analyze pipe flows as well as fluid machinery.	3	100%
CO 401.4	Understands the working & principle of different flow meters	3	100%
CO 401.5	Understands the working & principle of different pumps.	3	100%
CO401.6	Understands the concepts of two-phase flow.	3	100%
CHEMICAL ENGG. THERMODYNAMICS -II			
CO 402.1	Ability to apply fundamental concepts of thermodynamics to engineering applications.	3	100%
CO 402.2	Ability of application of thermodynamics to phase equilibria and reaction equilibria	3	100%
CO 402.3	Applies thermodynamics to conversion devices.	3	100%
CO 402.4	Applied to design the chemical engineering equipments in processes	3	100%
CO402.5	Capability to determine thermodynamic efficiency of various energy related processes	3	100%
CO 402.6	Ability to estimate thermodynamic properties of substances in gas and liquid states.	3	100%
MACHINE DESIGN AND DRAWING			
CO 403.1	Student will be able to identify & calculate different forces & stresses induced in the machine parts like gears, I C engine parts, couplings, pr vessels etc.	3	100%
CO 403.2	Student will be able to choose appropriate functions for different service conditions	3	100%
CO 403.3	Student will be able to explain and formulate different optimization techniques	0.4	13%
CO 403.4	Student will be able to design various mechanical components e.g. belt, rope, chain, gears, C engine parts, couplings, pressure vessels etc	0.4	13%
CO 403.5	Student will be able to understand the different types of joints.	0.4	13%
CO 403.6	Student will get knowledge of the machine design & drawing.	0.4	13%
APPLIED PHYSICAL CHEMISTRY			
CO 404.1	Student gets knowledge of the thermodynamic properties of ideal and real solutions for the determination of the ions.	2.8	93%
CO 404.2	Ability to understand kinetic theory of the gases	2.4	80%
CO 404.3	Ability to understand radiation chemistry and spectroscopy	2.8	93%
CO 404.4	Ability to understand surface phenomena and catalysis	2.6	87%
CO 404.5	Ability to understand chemical equilibrium and kinetics	2.4	80%
CO 404.6	Ability to understand laws of thermodynamics	2.4	80%
MECHANICAL OPERATIONS			
CO 405.1	Ability to understand fluid particle systems and equipment	2	67%
CO 405.2	Ability to select suitable size reduction equipment, solid-solid separation method and conveying system	2.2	73%
CO 405.3	Ability to understand physical properties used for purification	1.6	53%
CO 405.4	Understanding of fluid flow through packed and fluidized beds	2.2	73%
CO 405.5	Ability to select different solid fluid separation equipments	2.2	73%
CO 405.6	Ability to analyze mixing processes using different types of mixers	2.2	73%
HEAT TRANSFER			
CO 501.1	The concepts of heat transfer	3	100%
CO 502.2	Understands mechanisms of conduction, convection and radiation	3	100%
CO 503.3	The heat transfer in parallel & counter current flow	3	100%
CO 504.4	Analyzes the performance of heat exchange equipments & evaporators.	3	100%
CO 505.5	The effect of heat transfer in boiling and evaporators	3	100%
CO 506.6	The components subjected to thermal loading	3	100%
CHEMICAL ENGINEERING PROCESS-I			
CO 502.1	Importance and components of chemical engineering.	0.6	20%
CO 502.2	Concepts of unit operations and unit processes	0.6	20%
CO 502.3	Knows current scenario of chemical & allied process industries	0.6	20%
CO 502.4	Understands the manufacturing of various inorganic chemicals	0.6	20%
CO 502.5	Understands the process flow diagram and various process parameters	0.4	13%
CO 502.6	Identifies and solve engineering problems during production.	0.4	13%
ECONOMICS AND MANAGEMENT			
CO 503.1	Understands the happenings in the field of economics & preliminary idea about management.	0.6	20%
CO 503.2	Performs & evaluate of present worth, future worth & annual worth analyses on one or more economic alternatives	0.6	20%
CO 503.3	Performs & evaluate payback period & capitalized cost on one or more economic alternatives	0.2	7%
CO 503.4	Carries out & evaluates benefit/cost, life cycle & break even analyses on one or more economic alternatives	0.2	7%
CO 503.5	Makes economic analyses in the decision making process to justify or reject alternative/projects on economic basis	0.2	7%
CO 503.6	Social awareness & Marketing strategy related to economics is evaluated.	0.2	7%
MATERIAL SCIENCE & ENGINEERING			
CO 504.1	Understands the atomic, molecular, crystalline & microscopic structures of engineering materials.	0.6	20%
CO 504.2	Predicts and controls material properties	0.6	20%
CO 504.3	Develops the techniques, skills, and modern engineering tools necessary for engineering practice	0.6	20%
CO 504.4	Makes understand the different corrosion types and properties	0.6	20%
CO 504.5	Helps to select the polymeric materials for equipments	0.6	20%
CO 504.6	Understand the basic issues involved in polymer blends, composites and nanocomposites.	0.6	20%

COMMUNICATION SKILL			
CO 505.1	Knows the sources, characteristics & effects of air pollution on living and non-living things	3	100%
CO 505.2	Understand the atmospheric dispersion of air pollutants.	3	100%
CO 505.3	Meteorological factors affecting the air pollution	3	100%
CO 505.4	Theory and development of pollution control devices	3	100%
CO 505.5	Understand environmental regulatory legislations and standards	3	100%
CO 505.6	Principles & standards of air sampling	3	100%
MASS TRANSFER-I			
CO 601.1	Students will learn about the diffusional mass transfer	3	100%
CO 601.2	Interphase and different analogies of mass transfer	3	100%
CO 601.3	Student will understand the mechanism of crystallization and absorption	3	100%
CO 601.4	Operation of Drying will be understood.	3	100%
CO 601.5	Design and operation of the equipments can be understood	3	100%
CO 601.6	Recent developments in mass transfer operation.	3	100%
CHEMICAL ENGINEERING PROCESS-II			
CO 602.1	Importance and components of chemical engineering.	0.6	20%
CO 602.2	Concepts of unit operations and unit processes.	0.6	20%
CO 602.3	Understands the manufacturing of various organic chemicals	0.6	20%
CO 602.4	Understands the process flow diagram and various process parameters	0.6	20%
CO 602.5	Identifies and solve engineering problems during production	0.4	13%
CO 602.6	Knows current scenario of chemical & allied process industries.	0.4	13%
COMPUTER PROGRAMMING & APPLICATIONS			
CO 603.1	Finds the numerical solution of first order differential equation	3	100%
CO 603.2	Finds the solutions to linear equations using different methods.	3	100%
CO 603.3	Finds the roots of the equation by Newton-Raphson method	3	100%
CO 603.4	Designs algorithm for regression.	3	100%
CO 603.5	Understands the elements of optimization techniques	3	100%
CO 603.6	Design programs involving decision structures, loops and functions.	3	100%
PLANT EQUIPMENT DESIGN AND DRAWING			
CO 604.1	Knowledge of basics of process equipment design and important parameters of equipment design.	0.2	7%
CO 604.2	Knowledge of process equipment accessories & support systems	0.2	7%
CO 604.3	Ability to design pressure vessels subjected to internal and external pressures	0.2	7%
CO 604.4	Ability to design special vessels (e.g. tall vessels) and various parts of vessels (e.g. heads).	0.2	7%
CO 604.5	Knowledge of equipment fabrication and testing methods	0.4	13%
CO 604.6	Designs of the piping system.	0.4	13%
NON-CONVENTIONAL ENERGY SOURCES			
CO 605.1	Knows the energy demand of world, nation and available resources to fulfill the demand.	3	100%
CO 605.2	Knows current scenario of renewable energy sources	3	100%
CO 605.3	Knows about the exploration of nonconventional energy resources and their effective tapping technologies.	3	100%
CO 605.4	Understands the basic principles, unit operations and unit processes.	3	100%
CO 605.5	Effective utilization of available renewable energy resources.	3	100%
CO 605.6	Acquires the knowledge of modern energy conversion technologies	3	100%
MASS TRANSFER-II			
CO701.1	Separation by liquid- liquid Extraction	0.6	20%
CO701.2	Separation by leaching	0.6	20%
CO701.3	Design calculation of distillation column	0.6	20%
CO701.4	Design calculation of multi component distillation column	0.6	20%
CO701.5	Design and operation of the equipments can be understood.	0.6	20%
CO701.6	Recent developments in mass transfer operation.	0.6	20%
CHEMICAL REACTION ENGINEERING-I			
CO702.1	Develop rate laws for homogeneous reactions.	0.6	20%
CO702.2	Design of ideal reactors for single and complex reactions.	0.6	20%
CO702.3	Develop skills to choose the right reactor among single, multiple, recycle reactor, etc.	0.6	20%
CO702.4	Design of multiple reactor system	0.6	20%
CO702.5	Design of non-isothermal reactors.	0.6	20%
CO702.6	Design of recycle reactors.	0.6	20%
PROCESS DYNAMICS & CONTROL			
CO703.1	Students will be able to model a physical process.	1.4	20%
CO703.2	Students will have the knowledge of various controller designs, and methods of controller tuning	1.4	20%
CO703.3	Understands the advanced control techniques.	1.4	20%
CO703.4	Students will be exposed to various complex control schemes, characteristics and application of control valves.	1.4	20%
CO703.5	Understands the frequency response methods.	1.4	20%
CO703.6	Understands the dynamics and control of chemical equipments	1.4	20%
INDUSTRIAL WASTE TREATMENT			
CO704.1	Understand the different types of wastes generated in an industry,	0.6	20%
CO704.2	Understand the different unit operations and unit processes involved in conversion of	0.6	20%
CO704.3	Understand about the quantification and analysis of wastewater and treatment.	0.6	20%
CO704.4	Understand the disposal of water pollutants, and operating principles of control devices	0.6	20%
CO704.5	Understand advanced waste water treatment processes	0.6	20%
CO704.6	Understand environmental regulatory legislations and standards and climate changes.	0.6	20%
PLANT DESIGN AND PROJECT ENGINEERING			
CO705.1	Understand concepts of plant design and project engineering	2.2	73%
CO705.2	Synthesize feasible and optimum flow-sheet.	2.2	73%
CO705.3	Estimation of capital investment, total product costs, and profitability.	2.2	73%
CO705.4	Optimum design of equipments based on economics and process considerations.	2.2	73%
CO705.5	Understands the replacement and maintenance analysis	2.2	73%
CO705.6	Understands inventory control and project management	2.2	73%

TRANSPORT PHENOMENA			
CO801.1	Understanding of transport processes.	2.4	73%
CO801.2	Understands mass, momentum and energy balance equations	2.4	73%
CO801.3	Ability to analyze industrial problems along with appropriate boundary conditions	2.8	73%
CO801.4	Understands the boundary layer and its equations.	2.8	73%
CO801.5	Ability to do heat, mass and momentum transfer analysis.	2.4	73%
CO801.6	Understands the mass transfer analogies.	2.4	73%
CHEMICAL REACTION ENGINEERING-II			
CO802.1	Ability to distinguish between various RTD curves and predict the conversion from a non-ideal reactor using tracer information.	0.8	27%
CO802.2	Develop rate laws for heterogeneous reactions.	1.4	47%
CO802.3	Understands the adsorption phenomena	0.8	27%
CO802.4	Design of reactors for non-catalytic and catalytic reactions.	0.8	27%
CO802.5	Design of towers for gas-liquid operations with and without chemical reaction.	0.8	27%
CO802.6	Designs different reactors.	0.8	27%
SYSTEM MODELLING			
CO803.1	Understand the important physical phenomena from the problem statement	1.6	27%
CO803.2	Develop model equations for the given system	1.6	47%
CO803.3	Demonstrate the model solving ability for various processes/unit operations	2	27%
CO803.4	Demonstrate the ability to use a process simulation	2	27%
CO803.5	Ability to solve problems by using least square analysis.	1.6	27%
CO803.6	Understand Correlation and Regression	1.6	27%
PROCESS CHEMICAL TECHNOLOGY			
CO804.1	Introduction with the petroleum refinery worldwide	3	53%
CO804.2	Develop knowledge of different refining processes	3	53%
CO804.3	Develop knowledge of safety and pollution control in the refining industries	3	67%
CO804.4	To find the suitable refining technology for maximizing the gasoline yield	3	67%
CO804.5	Understanding of various catalytic conversion processes	3	53%
CO804.6	Understands different finishing and lube oil manufacturing process.	3	53%

JAWAHARLAL DARDA INSTITUTE OF ENGINEERING & TECHNOLOGY, YAVATMAL
Department of chemical Engineering
SUMMARY SHEET
PO ATTAINMENT FOR 3 YEARS

Pos	Title	TOTAL % OF PO'S MAPPED					
		SESSION 2014-15		SESSION 2015-16		SESSION 2016-17	
		%Attentment	level	%Attentment	level	%Attentment	level
PO1	To apply knowledge of mathematics, science, and engineering	78.72%	2.3616	88.44%	2.6532	78.88%	2.3664
PO2	To design and conduct experiments, as well as to analyze and interpret data,	87.08%	2.6124	87.43%	2.6229	77.68%	2.3304
PO3	To design a system, component, or process to meet desired needs within realistic constr	76.00%	2.28	86.55%	2.5965	78.89%	2.3667
PO4	To function on multidisciplinary teams in chemical engineering and research	56.00%	1.68	83.02%	2.4906	71.52%	2.1456
PO5	To identify, formulate, and solve engineering problems	60.00%	1.8	85.23%	2.5569	74.62%	2.2386
PO6	To understand professional and ethical responsibility	78.41%	2.3523	85.44%	2.5632	78.16%	2.3448
PO7	To communicate effectively	62.47%	1.8741	83.06%	2.4918	77.81%	2.3343
PO8	and the impact of engineering solutions in a global, economic, environmental, and socie	75.65%	2.2695	84.10%	2.523	75.87%	2.2761
PO9	To recognition of the need for, and an ability to engage in life-long learning,	79.93%	2.3979	89.63%	2.6889	79.93%	2.3979
PO10	To get knowledge of contemporary issues in chemical engineering and research.	80.09%	2.4027	84.91%	2.5473	72.02%	2.1606
PO11	To use the techniques, skills, and modern engineering tools necessary for engineering pr	80.49%	2.4147	89.36%	2.6808	77.36%	2.3208
PO12	To give basic knowledge about chemical Engineering Software. (Chemcad Software)	75.91%	2.2773	85.49%	2.5647	74.91%	2.2473

JAWAHARLAL DARDA INSTITUTE OF ENGINEERING & TECHNOLOGY, YAVATMAL
Department Of Chemical & Engineering
SUMMARY SHEET OF PSO ATTAINMENT IN SESSION 2014-15,15-16 and 16-17



Academic Session	PSO						
	PSO 1		PSO 2		PSO 3		
	level	%Attentment	level	%Attentment	level	%Attentment	
Session	2014-15	1.80	60.00%	2.25	75.00%	1.35	45.00%
	2015-16	1.83	61.00%	2.22	74.00%	1.35	45.00%
	2016-17	1.83	61.00%	2.25	75.00%	1.32	44.00%