CMR Institute of Technology, Bangalore			
Department(s): Mechanical Engineering			
Semester: 08	Section(s): A & B		
Operations Management		10ME81	Lectures/week: 06
Course Instructor(s): Mr. Gopi. S			
Course duration: 19 Jan 2017 – 06 May 2017			

Lecture #	Book & Sections	Topics	Portions coverage %	
			Individual	Cumulative
1-6	TB1: Pg 2 To 21	**Production and operations Management:** Introduction to Operation Management, Historical Development of Operation Management. Trends in Operation Management, Information and Non Manufacturing Systems Productivity, Types of Productivity factors affecting Productivity International dimensions of Productivity. The Environment of Operations. Production System decision a look Head	12.5%	12.5 %
7-12	TB2: 3.1 To 3.6	**Decision Making:** Introduction, Management as Science, Characteristics of Decisions Framework for decision Making, Decision Methodology. Decision support systems, Economic models. Problems on Economic models-BEA Statistical models, Probability rules and problems on Statistical models and Decision tree analysis.	12.5 %	25 %
13-18	TB1: Pg 63 To 96 TB2: 4.1 To 4.4.10	**Forecasting:** Opinion and Judgmental methods of forecasting. Time series methods, Components of forecasting. Simple Exponential smoothing technique, Problems, Regression and correlation methods, Problems, Application and control of Forecasts problems Forecast errors.	12.5%	37.5%
19-25	TB1: Pg 168 To 246 TB2: 5.1To 5.6	**Capacity & Location Planning:** Introduction to system design and capacity manufacturing and service systems Design capacity and systems capacity determinants of effective capacity Determination of capacity requirements capacity planning and types Facility location factors to be considered for selecting locations Location planning for goods and services evaluating location decisions Plant layout, objectives, need for layout decisions Product process fixed and combination layouts their merits and demerits	12.5%	50%
26-34	TB1: Pg 540 To 560 TB2: 10.1 To 10.1.3	**Aggregate planning & Master Scheduling:** Objectives of Aggregate Planning, Strategies of AP. Aggregate Planning methods, Policy guidelines, Problems on graphical and charting methods of AP Mathematical techniques for Planning Transportation Method for Linear Programming Problems. Master Scheduling concepts and its Objectives. Methods of Master scheduling Problems on Master Scheduling Functions of Master schedule Master Schedule formation	12.5%	62.5%

35-41	TB1: Pg 481 To 514 TB2: 9.1To 9.4.4	**Inventory Management:** Definition need and importance of inventory control Types of inventories, objectives of inventory control Inventory costs, requirements for effective inventory management Basic EOQ Model derivation with assumptions Problems on basic EOQ Models, Production quantity model and quantitative price discounts and problems	12.5%	75%
42-48	TB1: Pg 574 To 595 TB2: 11.1 To 11.4	**Material Requirement Planning:** MRP Concept Dependent and independent demand MRP Inputs and outputs Concept of tree structure problems on MRP Concept of MRP-II Concept of ERP And CRP Benefits and limitations	12.5%	87.5%
49-54	TB1: Pg 692 To 721	**Purchasing & Supply Chain Management:** Concept of purchasing procurement and SCM Concept of tenders open closed and direct tendering process Concept of vendor development, vendor management Problems on vendor rating Concept of make/buy decisions Types of buying	12.5%	100%

Syllabus for Sessional:

Sessional #	Syllabus
T1	Class # 01 – 18
T2	Class # 19 – 41
T3	Class # 42 – 54

Literature:

Book Type	Code	Author & Title	Publication info	
			Edition & Publisher	ISBN #
Text Book	TB1	Production and operations management by Wiliam. J. Stevenson	6th Edition TaTa McGraw Hill Books	9780073661124
Text Book	TB2	Production and operations management by Pannerselvam	2nd Edition PHI	9788120327672
Reference Book	RB1	Production and Operations Management by Verett. E. Adams, Ronald .J. Ebert	4th Edition PHI	9780137180080
Reference Book	RB2	Production and Operations Management by Joseph .G. Monks	2nd Edition McGraw Hill Books	9780070427204
Reference Book	RB3	Operations Management for competitive advantage by R.B Chase, N.J. Aquilino, F. Roberts Jacob	McGraw Hill Companies Inc.	0070604487

CMR Institute of Technology, Bangalore			
Department: Mechanical Engineering			
Semester: 08	Sections: A & B		
Mechanics of Materials		10ME82	Lectures/week: 06
Course Instructor: Mr. VINAY.M.N			
Course duration: 19th, Jan 2017 – 21st May 2017			

Lesson Plan

Lecture #	Chapter Title / Reference Literature	Topics	Portions coverage %	
			Individual	Cumulative
01	UNIT 1 Introduction	Introduction, Concept of automatic controls	12.5%	12.5%
02		Open loop and closed loop systems		
03		Concepts of feedback		
04		Requirements of an ideal control system		
05		Types of controllers- Proportional controller		
06		Integral controller, Proportional Integral controller		
07		Proportional Integral Differential controller		
08	UNIT- 2 Mathematical Models	Transfer function models	12.5%	25%
09		Models of mechanical systems		
10		Models of electrical circuits		
11		Models of DC and AC motors in control systems		
12		Models of DC and AC motors in control systems		
13		Models of thermal systems		
14		Models of hydraulic systems and pneumatic systems		
15		Models of hydraulic systems and pneumatic systems		
16		Analogous systems: Force-voltage, Force-current		
17		Analogous systems: Force-voltage, Force-current		
18		Analogous systems: Force-voltage, Force-current		
19		Analogous systems: Force-voltage, Force-current		
20	UNIT - 3 Block Diagrams and Signal Flow Graphs	Transfer Functions definition, function, block representation of systems elements, reduction of block diagrams	12.5%	37.5%
21		Reduction of block diagrams		

22		Reduction of block diagrams		
23		Reduction of block diagrams		
24		Reduction of block diagrams		
25		Signal flow graphs: Mason's gain formula		
26		Signal flow graphs: Mason's gain formula		
27		Signal flow graphs: Mason's gain formula		
28		Signal flow graphs: Mason's gain formula		
29	UNIT- 4 Transient and Steady State Response Analysis	Introduction	12.5%	50%
30		First order and second order system response to step, ramp and impulse inputs		
31		First order and second order system response to step, ramp and impulse inputs		
32		Concepts of time constant and its importance in speed of response		
33		Concepts of time constant and its importance in speed of response		
34		Concepts of time constant and its importance in speed of response		
35		System stability: Routh's-Hurwitz Criterion		
36		System stability: Routh's-Hurwitz Criterion		
37	UNIT - 5 Frequency Response Analysis	Polar plots	12.5%	62.5%
38		Polar plots		
39		Nyquist stability criterion		
40		Nyquist stability criterion		
41		Nyquist stability criterion		
42		Stability analysis, Relative stability concepts,		
43		Stability analysis, Relative stability concepts,		
44		Gain margin and phase margin, M&N circles		
45	UNIT - 6 Frequency Response Analysis Using Bode Plots	Bode attenuation diagrams, Stability analysis using Bode plots	12.5%	75%
46		Simplified Bode Diagrams		
47		Stability analysis using Bode plots		
48		Stability analysis using Bode plots		
49		Stability analysis using Bode plots		
50		Stability analysis using Bode plots		
51		Stability analysis using Bode plots		
52	UNIT - 7 Root Locus Plots	Definition of root loci, General rules for constructing root loci	12.5%	87.5%
53		Analysis using root locus plots.		
54		Analysis using root locus plots.		
55		Analysis using root locus plots		
56		Analysis using root locus plots		
57		Analysis using root locus plots		
58		Analysis using root locus plots		
59		Analysis using root locus plots.		
60	UNIT 8 System Compensation and State Variable	Series and feedback compensation,	12.5%	100%
61		Introduction to state concepts,		
62		State equation of linear continuous data system		

63	Characteristics of Linear Systems	State equation of linear continuous data system		
64		State equation of linear continuous data system		
65		Matrix representation of state equations, controllability and observability		
66		Matrix representation of state equations, controllability and observability		
67		Kalman and Gilberts test		

Syllabus for Internal Assessment Tests (IAT)*

IAT #	Syllabus
IAT-1	Class # 01 – 24
IAT-2	Class # 25 - 48
IAT-3	Class # 49 - 67

* See calendar of events for the schedules of IATs.

Literature:

Book Type	Code	Author & Title	Publication info	
			Edition & Publisher	ISBN No.
Text Book	TB1	**Modern Control Engineering** by Katsuhiko Ogatta	Pearson Education, 2004	
Text Book	TB2	**Control Systems Principles and Design** by M.Gopal	Tata McGraw-Hill Education, 2002	0070482896, 9780070482890
Reference Book	RB1	**Modern Control Systems** by Richard.C.Dorf and Robert.H.Bishop	Addison Wesley,1999	
Reference Book	RB2	**System dynamics & control** by Eronini-Umez, Thomson	Asia pte Ltd - 2002	
Reference Book	RB3	**Feedback Control System**	Schaum's series. 2001	

CMR Institute of Technology, Bangalore		
Department: Mechanical Engineering		
Semester: 08 (B.E)		
Rapid Prototyping	10ME837	Lectures/week: 05
Course Instructor: Prof. H. Manikandan		

Lesson Plan

Class #	Chapter Title / Reference Literature	Topic	Percentage of portion covered	
			Reference	Cumulative
Introduction to Rapid Prototyping				
1-3	TB-2 1.1 – 1.6	Introduction: Need for the compression in product development, history of RP systems, Survey of applications, Growth of RP industry, and classification of RP systems.	10%	10%
Introduction to Stereolithography				
4 – 7	TB-1 10.1-10.5	Stereo Lithography Systems: Principle, Process parameter, Process details, Data preparation, data files and machine details, Application	5%	15%
Selective Laser Sintering				
8-10	TB-1 11.1-11.8	Type of machine, Principle of operation, process parameters, Data preparation for SLS, Applications	5%	20%
Fused Deposition Modelling				
11-14	TB-1 8.1-8.5	Principle, Process parameter, Path generation, Applications.	5%	25%
Solid Ground Curing				
15 - 17	TB-2 3.2	Principle of operation, Machine details, Applications	5%	30%
Laminated Object Manufacturing				
18-20	TB-2 9.1-9.7	Principle of operation, LOM materials. Process details, application.	5%	40%
Concept Modellers				
21-26	TB-1 6.1-6.6, 7.1-7.4	Principle, Thermal jet printer, Sander's model market, 3-D printer. Genisys Xs printer HP system 5, object Quadra systems	10%	50%
Rapid Tooling				

27 – 32	TB-1 16.1-16.6 TB-3 5	Indirect Rapid tooling, Silicon rubber tooling, Aluminium filled epoxy tooling, Spray metal tooling, Cast kirksite, 3Q keltool, etc. Direct Rapid Tooling Direct. AIM.	10%	60%
Rapid Tooling				
33-38	TB-3 5	Quick cast process, Copper polyamide, Rapid Tool, DMILS, Prometal, Sand casting tooling, Laminate tooling soft Tooling vs. hard tooling.	10%	70%
Software for RP				
39-44	TB-2 6.1-6.7	STL files, Overview of Solid view, magics, imics, magic communicator, etc. Internet based software, Collaboration tools.	15%	85%
Rapid Manufacturing Process Optimization				
45-52	J-1	Factors influencing accuracy. Data preparation errors, Part building errors, Error in finishing, influence of build orientation.	15%	100%

Syllabus for Sessionals:

Sessional #	Syllabus
T1	Class # 01 – 20
T2	Class # 21 - 32
T3	Class # 33 - 52

Literature:

Book Type	Code	Author & Title	Publication info	
			Edition & Publisher	ISBN #
Text Book	TB-1	Kenneth.G.Cooper "Rapid Prototyping Technology: Selection and Application"	First Edition Marcel Dekker Inc.	0-8247-0261-1
Text Book	TB-2	Chua.C.K, Leong K.E and Lim.C.S. " Rapid Prototyping: Principles & Applications"	Second Edition World Scientific Publishing Co.Ltd	981-238-117-1
Text Book	TB-3	Hilton Jacobs "Rapid Tooling: Technologies & Industrial Applications"	First Edition Marcel Dekker Inc.	978-0824-7878-82
Journal	J-1	S.H.Choi and S.Samavedam, "Modelling & Optimization of Rapid Prototyping", Computers in Industry 47 (2002) 39-53	Elsevier	-

CMR Institute of Technology, Bangalore			
Department: Mechanical Engineering			
Semester: 8th	Section(s): A & B		
Subject: AUTOMOTIVE ENGINEERING		10ME844	Lectures/week: 06
Course Instructor(s): Mr. Cyril			
Course duration: Jan 2017 – June 2017			

LESSON PLAN

Class No.	Chapter Title / Reference Literature	Topic	Percentage of portion covered	
			Reference	Cumulative
1-7	TB1: 1.12, 1.13, 1.19, 1.20	**Engine Components and Cooling & Lubrication Systems:** Spark Ignition(SI) & Compression Ignition (CI) engines, cylinder – arrangements and their relatives merits, Liners, Piston, connecting rod, crankshaft, valves, valve actuating mechanisms, valve and port timing diagrams, Types of combustion chambers for S.I. Engine and C.I. Engines, Compression ratio, methods of a Swirl generation, choice of materials for different engine components, engine positioning, cooling requirements, methods of cooling, thermostat valves, different lubrication arrangements.	12.5	12.5
8-14	TB1: 1.14 to 1.17	**Fuels, Fuel Supply Systems for SI and CI Engines:** Conventional fuels, alternative fuels, normal and abnormal combustion, cetane and octane numbers, Fuel mixture requirements for SI engines, types of carburetors, C.D.& C.C. carburetors, multi point and single point fuel injection systems, fuel transfer pumps, Fuel filters, fuel injection pumps and injectors.	12.5	25
15-23	RB1: 1.2 to 1.8 RB2: 2.2 to 2.5 RB4: 5.1 to 5.4	**Power Trains:** General arrangement of clutch, Principle of friction clutches, Torque transmitted, Constructional details, Fluid flywheel, Single plate, multi-plate and centrifugal clutches. Gear box: Necessity for gear ratios in transmission, synchromesh gear boxes, 3, 4 and 5 speed gear boxes. Free wheeling mechanism, planetary gears systems, over drives, fluid coupling and torque converters, Epicyclic gear box, principle of automatic transmission, calculation of gear ratios, Numerical calculations for torque transmission by clutches.	12.5	37.5
24-31	RB1: 1.14 to 1.15 RB2: 1.6, 1.8	**Drive to Wheels:** Propeller shaft and universal joints, Hotchkiss and torque tube drives, differential, rear axle, different arrangements of fixing the wheels to rear axle, steering geometry, camber, king pin inclination, included angle, castor, toe in & toe out, condition for exact steering, steering gears, power steering, general arrangements of links and stub axle, over steer, under steer and neutral steer, numerical problems, types of chassis frames.	12.5	50
31-37	TB1: 1.17	**Superchargers and Turbochargers:** Naturally aspirated engines, Forced Induction, Types pf superchargers, Turbocharger construction and operation, Intercooler, Turbocharger lag.	12.5	62.5
38-45	TB1: 1.28, 1.29	**Ignition Systems:** Battery Ignition systems, magneto	12.5	75

		Ignition system, Transistor assist contacts. Electronic Ignition, Automatic Ignition advance systems.		
46-53	RB2: 2.7, 2.10, 2.1104 TB1: 1.7 to 1.10 RB4: 4.1 to 4.11	**Suspension, Springs and Brakes:** Requirements, Torsion bar suspension systems, leaf spring, coil spring, independent suspension for front wheel and rear wheel. Air suspension system. Types of brakes, mechanical compressed air, vacuum and hydraulic braking systems, construction and working of master and wheel cylinder, brake shoe arrangements, Disk brakes, drum brakes, Antilock –Braking systems, purpose and operation of antilock-braking system, ABS Hydraulic Unit, Rear-wheel antilock & Numerical Problems	12.5	87.5
54-61	RB3: 3.18	**Automotive Emission Control Systems:** Automotive emission controls, Controlling crankcase emissions, Controlling evaporative emissions, Cleaning the exhaust gas, Controlling the air-fuel mixture, Controlling the combustion process, Exhaust gas recirculation, Treating the exhaust gas, Air-injection system, Air-aspirator system, Catalytic converter, Emission standards- Euro I, II, III and IV norms, Bharat Stage II, III norms.	12.5	100

Syllabus for Internal Assessment Test

IAT#	Syllabus
IAT1	Class # 01 – 23
IAT2	Class # 24 - 45
IAT3	Class # 46 - 61

Literature:

Book Type	Code	Author & Title	Publication information	
			Edition / Publisher	ISBN #
Text Book	TB1	Automotive Mechanics	2nd Edition, Tata Mc.Graw-Hill	978-0070494916
Text Book	RB1	Automotive Transmissions and Power Trains, William H. Crouse	2nd edition, Webster Division, Mc.Graw-Hill Company	978-0070146372
References	RB2	Automobile engineering, Dr. Kirpal Singh, Vol. I	12th Edition, A.K. Jain	81-8014-015-6
References	RB3	Automobile engineering, Dr. Kirpal Singh, Vol. II	12th Edition, Standard Publishers	81-8014-177-2
References	RB4	Automotive Mechanics, Dr. N. K. Giri	7th Edition, Khanna Publications	-