

1. With respect to the feedback given by Mr.A.L. Ashok, Manager,MRF Ltd, subject title is changed as Industrial automation and Robotics(R2019) from Manufacturing automation(R2015) without changing the course content, R2015 syllabus is enclosed for reference.

R2019 Course Content

INDUSTRIAL AUTOMATION AND ROBOTICS

L T P C
3 0 0 3

OBJECTIVES:

- Justify the high cost of investment in automation through production economics concepts.
- Summarize the fundamental concepts and elements of computer-integrated manufacturing.
- Articulate various aspects of automated manufacturing such as fixed automation and programmable automation.
- Familiarize the automated material handling and storage systems
- Discover computerized planning, lean and agile systems.

UNIT I AUTOMATION

Types of production – Functions – Automation strategies – Production economics – Costs in manufacturing – Break-even analysis. 9

UNIT II AUTOMATED FLOW LINES

Transfer mechanism – Buffer storage – Analysis of transfer lines – Automated assembly systems. 9

UNIT III NUMERICAL CONTROL AND ROBOTICS

NC-CNC – Part programming – DNC – Adaptive control – Robot anatomy – Specifications – End effectors – Sensors – Robot cell design – CAD/CAM. 9

UNIT IV AUTOMATED HANDLING AND STORAGE

Automated material handling systems – AGV- AS/RS – carousel storage – Automatic data capture – bar code technology- RFID. 9

UNIT V MANUFACTURING SUPPORT SYSTEMS

Product design and CAD, CAD/CAM and CIM, Computer aided process planning- variant and generative approaches, Concurrent engineering and design for manufacture, Lean production, Agile manufacturing. 9

OUTCOMES:

TOTAL HOURS: 45

CO1: Select automated equipment based on break-even quantity and compute cost per component.

CO2: Analyze an automated flow line without and with buffer for its performance measures.

CO3: Acquire knowledge in Numerical control programming.

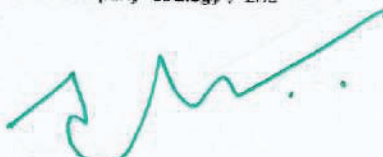
CO4: Identify the elements of manufacturing automation; these include CNC, Robotics, automated assembly and material handling.

CO5: Understand manufacturing planning and control systems.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		✓			✓						✓	
CO2												
CO3		✓	✓		✓		✓					
CO4					✓						✓	
CO5			✓		✓							✓

REFERENCES:

1. Mikell P.Groover, "Automation, Production Systems and Computer Integrated Manufacturing" PHI, 2003. 24
2. Weatherall, "Computer Integrated Manufacturing – A total company strategy", 2nd edition, 1995.


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R2015 Course Content

IL 7006

MANUFACTURING AUTOMATION

L T P C
3 0 0 3

OBJECTIVES:

- This course introduces the fundamental concepts and elements of computer-integrated manufacturing.
- The course exposes students to various aspects of automated manufacturing such as fixed automation and programmable automation.

UNIT I AUTOMATION

5

Types of production – Functions – Automation strategies – Production economics – Costs in manufacturing – Break-even analysis.

UNIT II AUTOMATED FLOW LINES

10

Transfer mechanism - Buffer storage – Analysis of transfer lines - Automated assembly systems.

UNIT III NUMERICAL CONTROL AND ROBOTICS

10

NC-CNC – Part programming – DNC – Adaptive control – Robot anatomy – Specifications – End effectors – Sensors - Robot cell design – CAD/CAM.

UNIT IV AUTOMATED HANDLING AND STORAGE

10

Automated material handling systems – AGV- AS/RS – carousel storage – Automatic data capture – bar code technology- RFID

UNIT V MANUFACTURING SUPPORT SYSTEMS

10

Product design and CAD, CAD/CAM and CIM, Computer aided process planning- variant and generative approaches, Concurrent engineering and design for manufacture, Lean production, Agile manufacturing.

TOTAL: 45 PERIODS

OUTCOMES:

Students will be able to

- Select automated equipment based on break-even quantity and compute cost per component.
- Analyze an automated flow line without and with buffer for its performance measures.
- Identify the elements of manufacturing automation; these include CNC, Robotics, automated assembly and material handling.
- Understand manufacturing planning and control systems.

REFERENCES:

1. Mikell P. Groover, "Automation, Production Systems and Computer Integrated Manufacturing" PHI, 2003.

2. Weatherall, "Computer Integrated Manufacturing – A total company strategy", 2nd edition, 1995.

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2. With respect to the feedback given by student representatives, Multi variate data analysis is changed as core subject in R2019. R2015 curriculum is enclosed for reference.

R2019 Curriculum

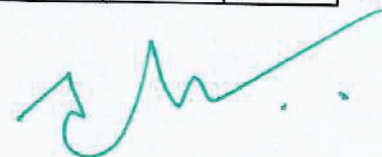
CURRICULUM AND SYLLABUS

SEMESTER I

S. NO.	CODE NO.	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.		Applied Statistics for Engineers	FC	3	1	0	4	4
2.		Work System Design and Ergonomics	PCC	4	0	0	4	4
3.		Optimization Techniques	PCC	3	1	0	4	4
4.		Program Elective I (one from list of electives I)	PEC	3	0	0	3	3
5.		Research Methodology and IPR	RMC	2	0	0	2	2
6.		Audit Course - I	AC	2	0	0	2	0
PRACTICALS								
7.		Work System Design and Ergonomics Lab	PCC	0	0	4	4	2
8.		Optimization Techniques Lab	PCC	0	0	4	4	2
TOTAL							27	21

SEMESTER II


S. NO.	CODE NO.	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.		Multi-Variate Data Analysis	PCC	3	1	0	4	4
2.		Applied Quality Engineering	PCC	3	1	0	4	4
3.		System simulation	PCC	3	0	0	3	3
4.		Program Elective II (one from list of electives II)	PEC	3	0	0	3	3
5.		Program Elective III (one from list of electives III)	PEC	3	0	0	3	3
6.		Audit Course -II	AC	2	0	0	2	0
PRACTICALS								
7.		Data Analytics Lab	PCC	0	0	4	4	2
8.		Simulation Lab	PCC	0	0	4	4	2
TOTAL							27	21



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R2015 Curriculum

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
YEAR 1	Semester 1	Probability and Statistical Methods	✓		✓							
		Operations Research	✓		✓							
		Work Design and Ergonomics		✓							✓	
		Facilities Design	✓		✓							
		Production Management	✓		✓							✓
		Elective 1										
		Work Design and Ergonomics Lab		✓			✓					
	Semester 2	Manufacturing Systems and Models	✓		✓							✓
		Quality Engineering	✓		✓							
		Systems and Simulation			✓	✓						✓
		Logistics and Supply Chain Management		✓	✓							✓
		Elective 2										
		Elective 3										
		Computer Applications Lab				✓	✓					
YEAR 2	Semester 1	Robust Design	✓			✓						✓
		Elective 4										
		Elective 5										
		Project Work Phase I			✓	✓	✓		✓	✓		
		Technical Seminar							✓	✓		
	Semester 2	Project Work Phase II			✓	✓	✓	✓	✓	✓		✓



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