SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Marine Engineering	LP: MR18505 Rev. No: 00 Date: 19.06.2020
B.E/~~B.Tech/M.E/M.Tech~~ : Marine Engineering Regulation: 2018 PG Specialisation : NA Sub. Code / Sub. Name : MR18505 / ENGINEERING METROLOGY, INSTRUMENTATION AND AUTOMATION Unit: 1 LINEAR, ANGULAR AND FORM MEASUREMENT	

Unit Syllabus: Introduction to Metrology – Principle and construction of measuring instruments- Linear measurement-Vernier caliper, Micrometer, Height gauge, Depth gauge- angular measurement-Bevel Protector, Auto collimator, Sine bar- Slip gauge-types, applications, and wringing method- Thread measurement - gear measurement, measurement of various element of Gear – Constant chordal method.

Objective:

To understand the working of linear, angular, form measuring instruments

Session No *	Topics to be covered	Ref	Teaching Aids
1	Introduction to Metrology	1 ch-1 pg. 1-12	PPT/BB /Online
2	Principle and construction of measuring instruments	1ch-3 pg. 53-56	PPT/BB /Online
3	Linear measurement-Vernier caliper	1ch-3 pg.72-76	PPT/BB /Online
4	Micrometer, Height gauge - Depth gauge	1ch-3 pg.78-87	PPT/BB /Online
5	Angular measurement-Bevel Protractor	1ch-6 pg 145-147	PPT/BB /Online
6	Auto collimator, Sine bar	1ch-6 pg 148-160	PPT/BB /Online
7	Slip gauge-types, applications, and wringing method	1ch-3 pg 87-96	PPT/BB /Online
8	Thread measurement	1ch-8 pg.203-227	PPT/BB /Online
9	Gear measurement, measurement of various element of Gear – Constant chordal method.	1ch-10 pg.287-307	PPT/BB /Online
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

Sub. Code / Sub. Name: MR18505/ ENGINEERING METROLOGY, INSTRUMENTATION AND AUTOMATION

Unit : II INSTRUMENTATION

Unit Syllabus: Static and dynamic characteristics of measuring instruments. Construction and operation of electrical testing and measuring equipment. Filters, Regulated Power Supply. Transducers and transmitters suitable for measurement of temperature, pressure, flow, level, speed, torque, vibration, humidity and water content with calibration.

Objective:

To provide basic idea about working principle and applications of devices for measurement of temperature, pressure, flow, level, speed and torque, etc.

Session No *	Topics to be covered	Ref	Teaching Aids
10	Static and dynamic characteristics of measuring instruments	1ch-16 pg.397-399	PPT/BB /Online
11	Construction and operation of electrical testing and measuring equipment	1ch-16pg.398	PPT/BB /Online
12	Filters, Regulated Power Supply	1ch-16pg.397	PPT/BB /Online
13	Transducers and transmitters suitable for measurement of temperature	1ch-16 pg.399-401,420-428	PPT/BB /Online
14	Pressure & flow measurement	1ch-16 pg.413-420,441-446	PPT/BB /Online
15	Level & speed measurement	1ch-16 pg.403,430-436	PPT/BB /Online
16	Torque measurement	1ch-16pg.439-441	PPT/BB /Online
17	Vibration measurement	1ch-16pg.409-411	PPT/BB /Online
18	Humidity and water content with calibration.	1ch-16 pg.428-430	PPT/BB /Online
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

Sub. Code / Sub. Name: MR18505/ ENGINEERING METROLOGY, INSTRUMENTATION AND AUTOMATION

Unit : III BASICS OF CONTROL SYSTEM

Unit Syllabus: Terms used in control systems, open loop and closed loop control systems - feedback and feed forward control systems -Fundamentals of Automatic Control, Various Automatic Control, ON-OFF Control, Sequential Control, Theory and characteristics of PID control and its tuning, Measurement of Process Value – Temperature (Mechanical, Electrical), Pressure, Level (Direct methods and Inferential methods), Flow, General measurement and process.

Objective:
To give exposure to basics of control system

Session No *	Topics to be covered	Ref	Teaching Aids
19	Terms used in control systems	4ch-1 pg.1-3	PPT/BB /Online
20	open loop and closed loop control systems	4ch-1 pg.3-5	PPT/BB /Online
21	feedback and feed forward control systems	4ch-1 pg.8-10	PPT/BB /Online
22	Fundamentals of Automatic Control, Various Automatic Control	4ch-1 pg.8-10, ch-3 pg.50-52	PPT/BB /Online
23	ON-OFF Control & Sequential Control	4ch-1 pg.8-10	PPT/BB /Online
24	Theory and characteristics of PID control and its tuning	4ch-7 pg.216-217	PPT/BB /Online
25	Measurement of Process Value – Temperature (Mechanical, Electrical)	1ch-16 pg.420-428	PPT/BB /Online
26	Pressure, Level (Direct methods and Inferential methods)	1ch-16 pg.413-420, 403	PPT/BB /Online
27	Flow, General measurement and process.	1ch-16 pg 441-446	PPT/BB /Online
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

Sub. Code / Sub. Name: MR18505/ ENGINEERING METROLOGY, INSTRUMENTATION AND AUTOMATION

Unit : IV CONTROL SYSTEM EQUIPMENT

Unit Syllabus: Transmission of Signals – Transmitters, Controlling elements (Pneumatic, Electrical, Electronics).Manipulator Elements – Principles, Operation, Application, Pneumatic, Electrical Servomotor, Hydraulic Servomotor- Features of Pneumatic and Hydraulic Control Equipment

Objective:
To familiarize with the working of Control system equipments.

Session No *	Topics to be covered	Ref	Teaching Aids
28	Transmission of Signals	4ch-1 pg.8-10	PPT/BB/ Online
29	Transmitters	4ch-1 pg.8-10	PPT/BB/ Online
30	Controlling elements (Pneumatic, Electrical, Electronics	4ch-2 pg 23-24	PPT/BB/ Online
31	Manipulator Elements – Principles, Operation, Application	4ch-1 pg.6-10	PPT/BB/ Online
32	Pneumatic Servomotor	4ch-13 pg.416-434	PPT/BB/ Online
33	Electrical Servomotor	4ch-13 pg.416-434	PPT/BB/ Online
34	Hydraulic Servomotor	4ch-13 pg.416-434	PPT/BB/ Online
35	Features of Pneumatic and Hydraulic Control Equipment	4ch-13 pg.416-434	PPT/BB/ Online

Content beyond syllabus covered (if any):

* Session duration: 50 minutes

Sub. Code / Sub. Name: MR18505/ ENGINEERING METROLOGY, INSTRUMENTATION AND AUTOMATION

Unit : V APPLICATION OF CONTROLS ON SHIPS

Unit Syllabus: Functions and mechanism of automatic control for main engines and auxiliary machinery - Generator distribution system, Steam boiler, Oil purifier, Refrigeration system, Pumping and piping system, Steering gear system, Cargo-handling equipment and deck machinery.
Design features and system configuration of automatic control equipment and safety devices for the following - General Requirements, Main Engine, Generator and distribution system, Steam boiler. Application of computers in ships.

Objective:
To provide knowledge about Automation and Controls fitted in ships

Session No *	Topics to be covered	Ref	Teaching Aids
36	Functions and mechanism of automatic control for main engines and auxiliary machinery	9 pg.201,225	PPT/BB /Online
37	Generator distribution system, Steam boiler	9pg.201,225	PPT/BB /Online
38	Oil purifier, Refrigeration system	9pg.212-213	PPT/BB /Online
39	Pumping and piping system, Steering gear system	9 pg.228	PPT/BB /Online
40	Cargo-handling equipment and deck machinery	9pg.219	PPT/BB /Online
41	Design features and system configuration of automatic control equipment and safety devices for the following -	9pg 281-282	PPT/BB /Online
42	Generator and distribution system	9 pg.201, 225	PPT/BB /Online
43	Steam boiler	9pg.201, 225	PPT/BB /Online
44	Application of computers in ships.	9pg.300-301	PPT/BB /Online
45	Application of computers in ships-Case study	9pg.300-301	PPT/BB /Online
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

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REFERENCES:

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3. Smith,"Application Of Automatic Machinery And Alarm Equipment In Ships", Marine Engineering Practice, Vol 1,Part 06, IMarEST, London
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5. Bolton, "Control Systems", 1st Ed. Elsevier, Indian reprint 2011(Yesdee Publishing)
6. L.F. Adams, "Engineering Instrumentation and Control", 1st Edition, English Language Book Society (ELBS), Hodder, Stoughton, Great Britain, 1984.
7. Peter Harriott, " Process Control", 26th reprint, Tata McGraw Hill Publishing Co. Ltd., 2005
8. Sinclair, "Sensors and Transdusers", 3rd Ed.Elsevier, Reprint 2011 (Yesdee Publishing)
9. Leslie Jackson, "Instrumentation and Control systems", 3rd edition, Thomas Reed Publication Limited, London, 1992.

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Designation	Assistant Professor	HoD/ MR
Date	19.06.2020	19.06.2020
Remarks*: The same lesson plan will be followed for the academic year 2020-2021. There is no change of syllabus		
Remarks*: The same lesson plan will be followed for the academic year 2021-22. There is no change in syllabus	S. Cekarasi AP/MAR	HOD/MR

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD.

S. Cekarasi AP-MAR

S. 01/8/22 HOD-MR