

GOVERNMENT POLYTECHNIC COLLEGE, KOTA (RAJ.)

SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE : **IE302**

SUBJECT NAME : **OPTICAL INSTRUMENTS & DEVICES**

FACULTY NAME : **Sanjay Verma**

DESIGNATION : **LECTURER (INSTRUMENTATION)**

TOPIC	PRACTICAL CLASSES REQUIRED TO COVER TOPIC	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
1. To draw input current versus output intensity curve of LED.	3	Sep-15			
2. To draw the input/ output characteristics of P V Cell	3	Sep-15			
3. To draw the input/ output characteristics of Photo diode	3	Oct-15			
4. To draw the input/ output characteristics of Photo transistor	3	Nov-15			
5. To draw the input/ output characteristics of Photo conductive (LDR)	3	Dec-15			
6. Measurement of light intensity by lux meter.	3	Jan-16			
7. Measurement of absorption coefficient of a liquid.	3	Feb-16			
8. Study of Optical filter.	3	Mar-16			
9. Study of Beam splitters.	2	Mar-16			
10. Study of Polarimeter.	2	Apr-16			
Revision	2	Apr-16			
TOTAL	30	Practical=2 X Lecture			

GOVERNMENT POLYTECHNIC COLLEGE, KOTA (RAJ.)

SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE : **IE204**

SUBJECT NAME : **DIGITAL ELECTRONICS**

FACULTY NAME : **SANJAY VERMA**

DESIGNATION : **LECTURER (INSTRUMENTATION)**

TOPIC	LECTURE CLASSES REQUIRED TO COVER TOPIC	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
1. Introduction : 1.1 Digital signal and its representation 1.2 Advantages of digital techniques	1	Aug-15			
2. Number System : 2.1 Decimal, binary, octal and hexa-decimal number system 2.2 Conversion of a number from one system to another system	2	Aug-15			
2.3 Binary addition, subtraction and multiplication 2.4 Representation of positive and negative numbers 2.5 1's complement and 2's complement	2	Sep-15			
2.6 Subtraction using 2's complement 2.7 Parity bit 2.8 Binary codes (Gray, Excess -3, Hamming codes), ASCII code 2.9 Floating point number	2	Sep-15			
3. Logic Gates : 3.1 Introduction 3.2 Symbol and truth table of NOT, AND, OR, NAND, NOR, EX-OR and EX-NOR gates	1	Sep-15			
3.3 Universal gates 3.4 Positive, negative and tristate logic	2	Sep-15			
4. Boolean Algebra : 4.1 Historical review - logical statements, logical constants and variables, truth table 4.2 Boolean operators	2	Sep-15			

4.3 Postulates of Boolean algebra 4.4 Laws of Boolean algebra	2	Oct-15			
4.5 Duality theorem 4.6 De' Morgan's theorem	1	Oct-15			
4.7 Simplification of Boolean expressions 4.8 Verification of Boolean expressions using truth table	2	Oct-15			
5. Minimization Techniques (K- Mapping) : 5.1 Representation of Boolean expression - min. and max. term SOP, POS 5.2 Conversion of truth tables in POS and SOP form	4	Nov-15			
5.3 Karnaugh map upto 4 variables - implication of logic function with and without don't care conditions 5.4 Realization of logic diagrams using NAND/NAND, NOR/NOR gate	2	Nov-15			
6. Combinational Logic Design : 6.1 Binary half and full adder 6.2 Binary half and full subtractor 6.3 Binary serial, parallel and BCD adder	2	Nov-15			
6.4 Parity bit generator and checker 6.5 Binary comparator	2	Nov-15			
6.6 Multiplexer 6.6.1 4 to 1 multiplexer 6.6.2 16 to 1 multiplexer	2	Dec-15			
6.7 Demultiplexer 6.7.1 1 to 4 Demultiplexer 6.7.2 1 to 16 Demultiplexer	2	Dec-15			

6.8 Encoder 6.8.1 Decimal to BCD	1	Dec-15			
6.9 Decoder 6.9.1 BCD to Decimal 6.9.2 BCD to seven segment	2	Jan-16			
7. Sequential Systems : 7.1 Introduction 7.2 Symbol, logic circuit, truth table of R-S, J-K, M/S J-K,D,T flip-flops 7.3 Edge and level triggering	3	Jan-16			
7.4 Shift registers 7.4.1 Left, right and bi-direction 7.4.2 Series and parallel 7.4.3 Universal shift register	2	Feb-16			
7.5 Asynchronous and synchronous counters - up, down and up-down 7.6 Mod counters - Mod 5, Mod 9, decade counter	2	Feb-16			
7.7 Ring counters, Johnson counter	1	Feb-16			
7.8 Programmable counters	1	Feb-16			
7.9 Use of shift register for simple binary multiplication and division.	2	Feb-16			
8. Logic Families : 8.1 Classification of digital ICs. 8.2 Characteristics of digital ICs.	2	Mar-16			

8.3 RTL/RCTL 8.4 DTL	2	Mar-16			
8.5 TTL logic - Operation of TTL NAND gate, open collector and totem - pole output, characteristics of TTL, TTL subfamilies	3	Mar-16			
8.6 Concept of ECL and I ² L. 8.7 PMOS, NMOS and CMOS (NAND, NOR, NOT) Circuits.	2	Mar-16			
8.8 Comparison of logic families 8.9 Interfacing TTL with CMOS family	2	Apr-16			
Revision and Problem solving classes	4	Apr-16			
TOTAL	60				

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DESIGNATION : **LECTURER (INSTRUMENTATION)**

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1. Verify the truth tables of NOT, AND, OR, NAND, NOR, EX-OR, EX-NOR gates	3	Sep-15			
2. Design a NOT, AND, OR, EX-OR, EX-NOR gates using universal gates	3	Sep-15			
3. Design a binary half and full adder	3	Oct-15			
4. Design a binary half and full subtractor	3	Nov-15			
5. Study of BCD to 7 segment decoder	2	Nov-15			
6. Verify the truth table of RS, D, J-K, M/S J-K,D,T flip-flops.	3	Jan-16			
7. Study of asynchronous binary ripple up, down and up-down and different mod counters	3	Feb-16			
8. Study of synchronous counters	2	Feb-16			
9. Study of decade counter	2	Mar-16			
10. Study of programmable counter	2	Mar-16			
11. Study of a shift register using flip flops	1	Mar-16			
12. Study of ring counter using flip flops	1	Apr-16			
Revision	2	Apr-16			
TOTAL	30	practical=2 x lecture			

GOVERNMENT POLYTECHNIC COLLEGE, KOTA (RAJ.)

SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE : **IE207**

SUBJECT NAME : **TRANSDUCERS AND TELEMETERY**

FACULTY NAME : **SANJAY VERMA**

DESIGNATION : **LECTURER (INSTRUMENTATION)**

TOPIC	LECTURE / PRACTICAL CLASSES REQUIRED TO COVER TOPIC	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
1. Transducers : 1.1 Definition 1.2 Classification of transducers	1	Aug-15			
2. Variable Resistive Transducers : 2.1 Potentiometers 2.2 Strain gauges 2.3 Resistance thermometers	2	Aug-15			
2.4 Thermistors 2.5 Hot wire anemometers 2.6 Photo conductive cell	2	Sep-15			
3. Variable Reluctance Transducers : 3.1 Variable reluctance 3.2 Linear variable Differential transformer 3.3 Synchro transmitter and receiver	2	Sep-15			
4. Variable Capacitance Transducers : 4.1 Variable plate area 4.2 Variable distance between plates 4.3 Variable dielectric	2	Sep-15			
5. Voltage and Current Generating Transducers : 5.1 Piezoelectric transducers 5.2 Photoelectric transducers - photo tubes 5.3 Photoconductive transducers	2	Sep-15			
5.4 Photo voltaic cell 5.5 Thermocouple 5.6 Magneto electric transducers	2	Oct-15			
6. Frequency Generating and Digital Transducers : 6.1 Frequency modulated transducers 6.2 Reluctance pulse picks up transducers	2	Oct-15			
6.3 Phototube pulse picks up transducers 6.4 Geiger counters 6.5 Scintillation counters	2	Oct-15			

7. Transducer Selection Factor : 7.1 Loading effects 7.2 Environmental conditions 7.3 Transducer measuring range 7.4 System compatibility 7.5 Cost and availability	2	Oct-15			
8. Telemetry System : 8.1 Land line telemetry 8.1.1 Pneumatic system 8.1.1.1 Flapper nozzle 8.1.1.2 Pilot relay 8.1.1.3 Non bleed type 8.1.1.4 Bleed types feed back 8.1.1.5 Limitations	3	Nov-15			
8.1.2 Electric system 8.1.2.1 Current system 8.1.2.2 Voltage system	1	Nov-15			
8.1.2.3 Impulse system 8.1.2.4 Position system or ratio system 8.1.2.5 Frequency system	2	Nov-15			
8.2 Radio frequency telemetering 8.2.1 Amplitude modulation 8.2.2 Frequency modulation	2	Nov-15			
8.2.3 Phase modulation 8.2.4 Pulse modulation	2	Dec-15			
8.2.5 Pulse amplitude modulation 8.2.6 Pulse code modulation	2	Dec-15			
9. Transmitters : 9.1 Pneumatic transmitter 9.1.1 PDPT bellow type 9.1.2 PDPT diaphragm type	2	Jan-16			
9.2 Electric transmitters 9.2.1 Wheatstone bridge 9.2.2 Inductance bridge	2	Jan-16			

9.2.3 Impedance bridge 9.2.4 Differential transformer 9.2.5 Synchro	2	Jan-16			
9.3 Electronic force balance DPT 9.4 Hydraulic transmitter	2	Feb-16			
10. Transmission Channels and Media : 10.1 Wire line channels	2	Feb-16			
10.2 Radio channels 10.3 Microwave channels	2	Feb-16			
10.4 Power line carrier channels 10.5 Multiplexing channels	2	Feb-16			
10.5.1 Frequency division 10.5.2 Time division	2	Mar-16			
11. Process Lags : 11.1 Measurement lags	2	Mar-16			
11.1.1 Capacity lag 11.1.2 Transfer lag	2	Mar-16			
11.1.3 Distance velocity lags 11.1.4 Effects of measurement lags	2	Mar-16			
11.2 Single capacity process 11.3 Multi capacity process	2	Apr-16			

11.4 Examples	1	Apr-16			
Revision and Problem solving classes	4	Apr-16			
TOTAL	60				

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FACULTY NAME : **SANJAY VERMA**

DESIGNATION : **LECTURER (INSTRUMENTATION)**

TOPIC	PRACTICAL CLASSES REQUIRED TO COVER TOPIC	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
To draw input output characteristics of linear variable differential transformer.	3	Sep-15			
To draw the resistance temperature characteristics of RTD	3	Sep-15			
To draw the resistance temperature characteristics of thermistor	3	Oct-15			
To draw the temperature characteristics of thermocouple	2	Nov-15			
Measurement of thickness of a object using capacitive transducer.	2	Nov-15			
Measurement of stress / pressure / weight by strain gauge.	2	Dec-15			
To study the synchro transmitter and receiver	2	Jan-16			
Torque transmission by synchro transmitter - receiver	2	Jan-16			
Realization of various process lags	1	Feb-16			
Measurement of pressure using pneumatic transmitter	2	Feb-16			
Measurement of differential pressure using PDPT	2	Mar-16			
Realization of electric transmitter	1	Mar-16			
Realization of electronic force balance DPT	1	Mar-16			
Study of hydraulic transmitter	1	Mar-16			
Study of different types of pilot relays	1	Apr-16			
Revision	2	Apr-16			
TOTAL	30	Practical=2xLecture			

GOVERNMENT POLYTECHNIC COLLEGE, KOTA (RAJ.)

SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE : **IE301**

SUBJECT NAME : **PROCESS CONTROLLER**

FACULTY NAME : **Sanjay Verma**

DESIGNATION : **LECTURER (INSTRUMENTATION)**

TOPIC	LECTURE CLASSES REQUIRED TO COVER TOPIC	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
1.Introduction to Automatic Control: 1.1 Concept of open and close loop system	2	Aug-15			
1.2 Automatic control system	1	Aug-15			
1.3 Transfer function 1.4 Concept of feedback and its effects	2	Sep-15			
2. Control Actions: 2.1 On- off control action	2	Sep-15			
2.2 Proportional control action 2.3 Derivative control action	2	Sep-15			
2.4 Integral control action	1	Sep-15			
2.5 P+D control action	2	Sep-15			
2.6 P+I control action 2.7 P+I+D control action	2	Oct-15			

2.8 Derivations of above actions	1	Oct-15			
3. Pneumatic Controllers:	1	Oct-15			
3.1 Basic control mechanism of pneumatic controller with flapper - nozzle as control element	1	Oct-15			
3.2 Proportional controller 3.3 PI controller	2	Oct-15			
3.4 PD controller	2	Nov-15			
3.5 PID controller	2	Nov-15			
4. Hydraulic Controllers:	2	Nov-15			
4.1 Principal of operation of presser control pilot					
4.2 Hydraulic Proportional controller 4.3 Hydraulic Proportional + Integral Controller	2	Nov-15			
4.4 Hydraulic Proportional + Derivation Controller	1	Nov-15			
4.5 Hydraulic Proportional + Integral + Derivation Controller	1	Dec-15			

5. Electronic Controllers: 5.1 Working of OP - AMP as 5.1.1 Amplifier 5.1.2 Adder	4	Jan-16			
5.1.3 Differentiator 5.1.4 Integrator 5.1.5 Comparator	3	Jan-16			
5.2 Electronic On - Off Controller 5.3 Electronic Proportional Controller	2	Jan-16			
5.4 Electronic Proportional + Integral Controller	2	Feb-16			
5.5 Electronic Proportional + Derivative Controller	2	Feb-16			
5.6 Electronic Proportional + Integral + Derivative Controller	2	Feb-16			
6. Special Control Schemes:	2	Feb-16			
6.1 Feed forward control	2	Mar-16			
6.2 Cascade control	2	Mar-16			
6.3 Ratio control	2	Mar-16			

6.4 Split range control 6.5 Selective control	4	Apr-16			
Revision and Problem solving classes	4	Apr-16			
TOTAL	60				

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FACULTY NAME : **Sanjay Verma**

DESIGNATION : **LECTURER (INSTRUMENTATION)**

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1. Realization of On - Off Controller and to verify its output	3	Sep-15			
2. Realization of electronic P Controller and to verify its output	4	Oct-15			
3. Realization of electronic PI Controller and to verify its output	4	Nov-15			
4. Realization of electronic PD Controller and to verify its output	4	Dec-15			
5. Realization of electronic PID Controller and to verify its output	4	Jan-16			
6. Study of Pneumatic PID Controller	3	Feb-16			
7. Study of Hydraulic PID Controller	3	Mar-16			
8. Study of Special control schemes	3	Apr-16			
Revision	2	Apr-16			
TOTAL	30	Practical=2 X Lecture			

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SYLLABUS BREAK-UP (SESSION 2015-16)

SUBJECT CODE : **IE302**

SUBJECT NAME : **OPTICAL INSTRUMENTS & DEVICES**

FACULTY NAME : **Sanjay Verma**

DESIGNATION : **LECTURER (INSTRUMENTATION)**

TOPIC	LECTURE / PRACTICAL CLASSES REQUIRED TO COVER TOPIC	MONTHS IN WHICH THE TOPIC WILL BE COVERED	ACTUAL DATE OF COVERING OF THE TOPIC	REASON FOR NOT COVERING THE TOPIC IN DUE TIME	E-CONTENTS PROVIDED TO STUDENTS RELATED TO TOPIC
Fundamentals of Optics : 1.1 Polarization,	3	Aug-15			
1.2 Diffraction 1.3 Interference	3	Sep-16			
1.4 Dispersion 1.5 Holograms	2	Sep-15			
Optical Sources : 2.1 Light Emitting Diodes (LEDs) 2.1.1 Structure	3	Sep-15			
2.1.2 Materials 2.1.3 Characteristics	4	Oct-15			
2.2. Lasers 2.2.1 Fundamentals of laser emission	3	Oct-15			
2.2.2 Different types of lasers 2.2.1 Gas laser	2	Oct-15			
2.2.2 Liquid lasers 2.2.3 Semiconductor lasers	4	Nov-15			

Photo Detectors :	2	Nov-15			
3.1 Photo Voltaic detectors					
3.2 Photo multiplier tube	2	Nov-15			
3.3 Photo conductive detector					
3.4 PIN diode	1	Dec-15			
Optical Fibers :	1	Dec-15			
4.1 Classification of optical fiber	1	Dec-15			
4.2 Principle of light transmission through fiber	2	Jan-16			
4.3 Material consideration	1	Jan-16			
4.4 Light sources for fiber optics	2	Jan-16			
4.5 Source coupling	2	Jan-16			
4.6 Splices and connectors	2	Feb-16			

Use of Lasers :	1	Feb-16			
5.1 Measurement of distance	1	Feb-16			
5.2 Measurement of velocity	1	Feb-16			
5.3 Measurement of acceleration	1	Feb-16			
Optical Instruments :	1	Feb-16			
6.1 Polarimeter	2	Mar-16			
6.2 Light intensity meter	2	Mar-16			
6.3 Spectrum analyzer	2	Mar-16			
6.4 X-ray fluoroscopic instruments	2	Mar-16			
6.5 Periscope 6.6 Optical filters	2	Apr-16			

6.7 Beam splitters	1	Apr-16			
Revision and problem solving classes	4	Apr-16			
TOTAL	60				