

# NATIONAL SUGAR INSTITUTE

MINISTRY OF CONSUMER AFFAIRS, FOOD & PUBLIC DISTRIBUTION  
DEPARTMENT OF FOOD & PUBLIC DISTRIBUTION  
Government of India  
**KANPUR**



सत्यमेव जयते

**ACADEMIC *BULLETIN***

**2018**

For

**DIPLOMA IN INDUSTRIAL  
INSTRUMENTATION &  
PROCESS AUTOMATION  
COURSE**

**DIPLOMA IN INDUSTRIAL INSTRUMENTATION &  
PROCESS AUTOMATION COURSE  
( D.I.I.P.A.)  
ACADEMIC CALENDAR**

<b>1.</b>	<b>Admission</b>	<b>July-2018</b>
<b>2.</b>	<b>Theory &amp; Practical Classes</b>	<b>July-2018 to 15<sup>th</sup> November -2018 &amp; April -2018</b>
<b>3.</b>	<b>Events organized by Games &amp; Sports, Cultural, Scientific Society</b>	<b>August/ September-2018</b>
<b>4.</b>	<b>Educational Tour</b>	<b>16<sup>th</sup> November-2018 to 30<sup>th</sup> November -2018</b>
<b>5</b>	<b>In plant Training</b>	<b>December- 2018 to March 2019</b>
<b>6.</b>	<b>Examination</b>	<b>May-2019</b>
<b>7.</b>	<b>Campus Interview through placement Cell.</b>	<b>As per the demand and Convenience of the industry</b>

**Note:**

- 1.The working of the Institute is from Monday to Friday i.e. five days in a week.**
- 2. The Institute also observed holidays for Central Government Offices in Kanpur.**

## 1. **RULES FOR ATTENDANCE AND LEAVE**

- 1.1 A student is required to put in a minimum of 75 percent attendance during each session in each subject. Non-compliance of this may render him debarred from appearing at the Diploma Examination.
- 1.1.1 Ordinarily, leave for 15 days is admissible to a student in an academic year.
- 1.2 Application of leave for absence must be handed over at the education section on the prescribed form in advance.
- 1.3 Application for leave must be counter signed by the Hostel Warden or the approved guardian.
- 1.4 Application for sick leave must be accompanied by a certificate from the Medical Officer of the Hostels.
- 1.5 Absence without leave by a student drawing a scholarship may result in the cancellation or reduction of his scholarship.

2. ***RAGGING : Ragging is strictly prohibited vide directions of Hon'ble Supreme Court in SLP No2495 of 2006 dated 16.05.2007 and in Civil Appeal No 887 of 2009, dated 08.05.2009. Any student found guilty of ragging and /or abetting ragging is liable to be punished.***

## 3. **EDUCATIONAL TOUR**

Students of D.I.I.P.A. Course are required to proceed on educational tour to Sugar Factory, Engineering works or other industrial units in order to acquaint themselves with their working and thus add to their knowledge . The educational tour is an essential part of the training programme and every student is required to participate in the tour. No exemption from Educational Tour is given. Students not proceeding on Educational Tour shall be detained in the same class **Failed Students are required to repeat the educational tour.**

## 4. **FACTORY TRAINING**

Students of the Course are sent for factory training, which enables them to supplement their theoretical knowledge with practical aspects. The Institute recommends the factories receiving students for practical

training, to give them suitable stipends, lodging, accommodation etc., during the course for their training at the factory.

## 5. SCHEME OF EXAMINATIONS

5.1 The examinations are held at the appropriate time as per Institute's calendar. Class tests may also be held during the middle of the session. Marks obtained at these tests and examinations as well as the marks assigned for class work and lecture notes of each student will be recorded for his class marks in each term.

### 5.2 Classification of Results:

It is necessary to pass in each subject separately in Theory, Practicals and Sessionals. The minimum pass marks in theory 35% and 50% in Practicals and Sessionals. The candidate would be declared to have passed a particular course in case he secures a minimum of 50% marks in aggregate. The division to students at the end of examinations are given according to the following standards:-

First Division	.	.	.	.	.	.	75% and above
Second Division	.	.	.	.	.	.	60% and above
Third Division	.	.	.	.	.	.	50% and above

### 5.3 Supplementary Examination

5.3.1 If a candidate fails in maximum of any two subjects at the First/Second/Final year examination but secures 50% marks in aggregate, he will be allowed to appear in the supplementary examination for these two subjects.

5.3.2 A candidate allowed to appear in the supplementary examination would be provisionally promoted to the next higher class and in case he fails in the supplementary examination also, he would be reverted to the lower class on declaration of supplementary examination results.

5.3.3 The student who passes in the said examination of any course in supplementary examination will be declared as "PASSED" and no division will be awarded to him.

## 5.4 Re-admission of Failed Students

If a candidate fails in Final examinations (including supplementary examination). He/she will be permitted to take the re-admission again in the following year, provided he/she attends the Institute as a regular student in the same class in which he/she had failed. If a student fails three times in a particular class he will be not re-admitted in that class in the Institute. If after failing in the class once a candidate does not take re-admission in the same class in the immediate next session his/her case will not be considered in future for re-admission.

### EXAMINATION SCHEDULE

<u>Subject</u>	<u>Maximum Marks</u>
<b><u>THEORY</u></b>	
Sugar Technology . . . . .	50
Sugar Technology (Chemical control) . . . . .	50
Alcohol Technology & By Products. . . . .	50
General Engineering . . . . .	50
Industrial Instrumentation. . . . .	50
Basic Electronics & Control systems . . . . .	50
Process Control system . . . . .	50
<b>PRACTICAL</b>	
Sugar Technology . . . . .	50
Instrument Engineering . . . . .	50
<b>SESSIONAL</b>	
Educational Tour - - - - -	50
Inplant Factory Training ( Factory Report ) - - - - -	50
Class Marks. . . . .	50
<b><u>GRAND TOTAL .</u></b>	<b><u>600</u></b>

# **SYLLABUS**

## **DIPLOMA IN INDUSTRIAL INSTRUMENTATION & PROCESS AUTOMATION**

**SUBJECT : SUGAR TECHNOLOGY (THEORY)**  
**CODE : IA/101 MAX.MARKS: 50**

- 1- Terminology, Introduction to various unit operation Sugar Processing i.e Cane weighment, Milling, Clarification Evaporation, Pan Boiling, & Crystallization, Centrifugation, Sugar Drawing & Storage etc, Energy and Water Conservation.
- 2- General Composition of Sugarcane and Sugarcane Juice, measurement and control of process parameters, process flow diagram for raw- refined – plantation white sugar.

**SUBJECT : SUGAR TECHNOLOGY (CHEMICAL CONTROL)**  
**CODE : IA/102 MAX.MARKS: 50**

- 1- General Principle of Chemical Control e.g. Mill extraction, reduced Mill Extraction, Brix Curve, Sugar Recovery, Capacity Utilization, Pol % Cane, Pol % Bagasse, Determination of Bagasse by indirect method.

**SUBJECT : ALCOHOL TECHNOLOGY & BY-PRODUCTS.**  
**CODE : IA/103 MAX.MARKS: 50**

1. Fermentation, types of fermentations and role of microorganism and other condition on fermentation. Raw Materials for fermentative production of alcohol, Molasses: Composition grades and classification of molasses, Outline of alcohol production by different fermentation process. Production of grain spirit. Chemical control, Theoretical Yield, Fermentation & Distillation Efficiency, etc. Different method of spent wash treatment including bio-methanation, incineration and bio composting.
2. Brewing technology: Malting, mashing, fermentation and pasteurization of beer, defects of beer.
3. Alcoholometry : Reduction and blending of spirits, denaturation, obscuration & shrinkage, potable liquors, country liquors & Indian Made Foreign Liquors.(IMFL)

**SUBJECT : GENERAL ENGINEERING.**

**CODE : IA/104**

**MAX.MARKS: 50**

- 1- Boiler:- Basics of boilers, types of boiler, operation of Boiler, performance of Boilers, Fuel and Combustion, Mounting and Accessories, various operating parameters and its impact.
- 2- Turbine:- Basics of turbine, type of turbine and its operation, determination of Specific Steam Consumption, various operating parameters, performance of turbine.
- 3- Mill:- Cane Handling devices, cane preparation & device details, Milling Techniques, operating parameters etc..
- 4- Motors:- Basics of Motors, AC & DC Motors and its types, control of motors using DRIVE AC & DC,
- 5- power generation, distribution and usage in sugar industry

**SUBJECT : INDUSTRIAL INSTRUMENTATION.**

**CODE : IA/105**

**MAX.MARKS: 50**

Basic concepts of measurements, system configuration, accuracy, precision, error, linearity, hysteresis, resolution, threshold, span, calibration. Introduction to transducers and its application signal Conditioning & signal Transmission. Measurement of process parameters like such as:- Temperature, Pressure, Level, Flow, Humidity, pH, Displacement, Speed, Weight, viscosity, turbidity, etc. Cane Weighment System, Online weighing of Sugar, Online Moisture Measurement.

**SUBJECT : BASIC ELECTRONICS & CONTROL SYSTEMS.**

**CODE : IA/106**

**MAX.MARKS: 50**

Diode, Triode, Transistor, Amplifier, Rectifier, Zener Diode, Thyristors (SCR), Logic gates, truth tables, K-map. Open Loop system, Closed Loop system, First order, Second Order system stability criteria & pool locus.

Process Control System: Controllers and its types with application. P, PI, PD & PID and its parameters. Valves: - Introduction to valves and its types. Solenoid Valves types and its application. Pneumatics and its application.

**SUBJECT : PROCESS CONTROL SYSTEM..**

**CODE : IA/107**

**MAX.MARKS: 50**

History of Automatic Control system and its development, System Architecture, Data Acquisitions System, PLC , DCS, Historian, Plant Network, SCADA, Different Control Loop such as ACFC, Juice Flow Stabilization, Auto pH Control, Boiler Drum Level, Combustion Control, Control in Boiling House, Turbine Control system, etc.

## **Practicals:-**

**SUBJECT : PROCESS CONTROL SYSTEM.**

**CODE : IA/108**

**MAX.MARKS: 50**

### **Instrumentation (Practicals)**

(1) Pneumatic Calibration Lab.:- Pressure gauge calibration through Dead Weight Tester, Draft gauge calibration with U Tube Manometer, Vacuum Gauge calibration through vacuum pump & U tube Manometer.

(2) Temperature calibration :- Temperature gauge, Thermocouple, Resistance temperature Detector.

(3) Control System :- Open Loop, Closed loop system and PID control system through live models.

(4) Pneumatic Control Valve :- Operation and Maintenance of control Valve.

(5) PLC :- Introduction of parts of PLC, Downloading and uploading of PLC programme, configuration of PLC, Programming of PLC through Ladder, Logics of sample Interlocks application to sugar Industry.

**SUBJECT : Sugar Technology (Practicals)**

**CODE : IA/109**

**MAX.MARKS: 50**

(1) Brix/Pol/Purity of juice/molasses/masseccuite and other sugar house products.

(2) Pol and Moisture % sugar

(3) Pol and Moisture % Bagasse

(4) Determination of pH, TDS ,and hardness of feed and Boiler water

(5) Determination of Sugar traces in water

(6) Determination of color of juice and sugar