राष्ट्रीय शर्करा संस्थान
कानपुर

NATIONAL SUGAR INSTITUTE
KANPUR

आई.एस.ओ. 9001:2008 प्रमाणित संस्थान

AN ISO 9001:2008 CERTIFIED INSTITUTE

सत्यमेव जयते

विवरण पत्रिका

PROSPECTUS
2016

CONTENTS

NATIONAL SUGAR INSTITUTE
KANPUR

1. HISTORICAL BACKGROUND

It was the Indian Sugar Committee appointed by Government of India in 1920 that first recommended the establishment of an all India Institute for research in Sugar Technology. The need for a Central Sugar Research Institute was also emphasized by the Royal Commission on Agriculture in 1928 and the Tariff-Board in 1930. The Government of India accordingly established the Imperial Institute of Sugar Technology at Kanpur in October, 1936 by taking over the Sugar Section of Harcourt Butler Technological Institute (H.B.T.I.), Kanpur. The Imperial Institute of Sugar Technology was placed under the administrative control of the Imperial Council of Agricultural Research but continued to be housed in the building of H.B.T.I. With the formation of Indian Central Sugarcane Committee in 1944, the administrative control of the Imperial Institute of Sugar Technology was transferred to that Committee. Consequent on India's attaining independence; the name of the Institute was changed to Indian Institute of Sugar Technology (I.I.S.T.). With the formation of the Development Council for Sugar Industry under the provisions of the Industries (Development and Regulation) Act 1951, the functions of the Indian Central Sugarcane Committee were abridged and with effect from 1st January, 1954, the administrative control of the Institute was transferred to the Government of India, under the then Ministry of Food & Agriculture. In April, 1957, the name of the Institute was again changed to National Sugar Institute (N.S.I.). The Institute shifted from H.B.T.I., to its present premises in 1963.

2. MAIN FUNCTIONS OF THE INSTITUTE:-

The main functions of the Institute are as follows:-

(i) To provide technical education and training in all branches of sugar chemistry, sugar technology, sugar engineering and allied fields;

(ii) To undertake research on:-

(a) problems pertaining to sugar technology, sugar and sugarcane chemistry and sugar engineering in general and those of sugar factories in particular; and

(b) utilization of by-products of sugar industry; and

(iii) To give technical advice and assistance to sugar factories with a view to improving their efficiency and to assist and guide them in their day-to-day problems. Assistance is also provided to Central and state Governments in matters relating to sugar and allied industries.

All these functions are carried out in an integrated manner, each one helping and influencing the other. The advisory and extension services bring the problems of the industry for research at the Institute. The research requires keeping abreast with modern developments and recent advances in science and technology. The close and continuing liaison between the Institute and the industry and the day-to-day knowledge gained through research give a practical base to the teaching and keep it up-to-date. These three functions- teaching, research and advisory make the Institute a unique one in the world.

3. ADVISORY BOARD

The activities of the Institute are guided by an Advisory Board set up by the Ministry of Consumer Affairs, Food & Public Distribution, Department of Food & Public Distribution, Government of India. The composition of the Board (constituted on 25th September 2014) is as follows :-

1.	Joint Secretary (Sugar & Sugar Admn.), Ministry of Consumer Affairs, Food and Public Distribution, Department of Food and Public Distribution, Krishi Bhawan, New Delhi.	Chairman
2.	Director Directorate of Sugar and Vegetable Oils Ministry of Consumer Affairs, Food and Public Distribution, Department of Food and Public Distribution, Krishi Bhawan, New Delhi.	Member
3.	Director/Dy. Secretary (Sugar Administration), Ministry of Consumer Affairs, Food and Public Distribution, Department of Food and Public Distribution, Krishi Bhawan, New Delhi.	Member
4.	Professor & Head of Chemical Engineering Department, Indian Institute of Technology, Kanpur	Member
5.	Director Indian Sugarcane Research Institute Lucknow.(U.P.)	Member
6.	Director, U.P. Council of Sugarcane Research, Shahjahanpur, U.P.	Member
7.	President or his representative, Sugar Technologist Association of India Okhla Phase –I New Delhi	Member
8.	President or his representative, Indian Sugar Mills Association, Ansal Plaza, August Kranti Marg, New Delhi	Member
9.	President or his representative, National Federation, of Co-operative Sugar Factories Ltd (NFCSF) Ansal Plaza, New Delhi.	Member
10.	President or his representative, All India Distilleries Association, Nehru Place, New Delhi	Member
11.	President or his representative, South Indian Sugarcane and Sugar Technologists Association, Kasthuribai Nagar Adyar Chennai	Member
12.	Director, National Sugar Institute, Kanpur.	Member Secretary

The advisory board considers the progress of work in different fields of activities of the Institute.

4. TEACHING STAFF OF THE INSTITUTE

The teaching staff of the institute (not in order of seniority) (as on 01-03-2016) is as under:-

	Shri Narendra Mohan, **B.Sc., A.N.S.I., F.N.S.I.(Sugar Technology)**	**DIRECTOR**
	SUGAR TECHNOLOGY	
1.	Dr. Ashutosh Bajpai M.Sc., Ph.D., A.N.S.I	Prof. of Sugar Technology
2.	Dr. Jahar Singh M.Sc., Ph.D., A.N.S.I.	Asstt. Prof. of Sugar Technology
3.	Shri Jitendra Singh M.Sc., A.N.S.I.	Asstt. Prof. of Sugar Technology
4.	Shri S.K. Trivedi B.Sc., A.N.S.I., F.N.S.I	Asstt. Prof. of Sugar Technology
5.	Shri A.K. Garg B.Sc., A.N.S.I.,	Asstt. Prof. of Sugar Technology
6.	Shri Mihir Mandal M.Sc., A.N.S.I.,	Asstt. Prof. of Sugar Technology
7.	Shri Mool Chandra B.Sc., A.N.S.I.,	Junior Technical Officer
8.	Shri Ajay Kumar Awasthi B.Sc., A.N.S.I.,	Junior Technical Officer
9.	Shri Vivek Pratap Singh B.Sc., A.N.S.I.,	Junior Technical Officer
10.	Shri Narendra Dev B.Sc., A.N.S.I.,	Junior Technical Officer
11.	Shri A.K. Asthana M.Sc., A.N.S.I.,	Junior Technical Officer
12.	Shri Mahendra Singh Yadav B.Sc., A.N.S.I.	Junior Technical Officer
13.	Shri Prem Shankar Katiyar B.Sc., A.N.S.I., P.G. Diploma in Computer Programming.	Senior Technical Assistant
14.	Shri Vaibhav Sharma B.Sc., A.N.S.I.,	Senior Technical Assistant
15.	Shri Mahendra Pratap Singh M.Sc., ANSI, MBA (HR)	Senior Technical Assistant
16.	Shri Ashish Kumar Shukla B.Sc., A.N.S.I.,	Technical Assistant

	SUGAR ENGINEERING	
1.	Shri Doctor Swain, AM.I.E. (Mech. Engg.)A.N.S.I.(Sugar Engg.) M. Tech.(Mech. Engg.)	Prof. of Sugar Engineering
2.	Shri Anoop Kumar Kanaujia, B.Tech (Elect. Engg.)	Assistant Professor of Sugar Engineering
3.	Shri Sanjay Chauhan B.Sc. Engg.(Mech.) BOI, ANSI(SE)	Assistant Professor of Sugar Engineering
4.	Shri Vinay Kumar AMIE (Elect. Engg.)M.Tech	Assistant Professor of Sugar Engineering
5.	Shri S.K. Chaudhary B.E. (Electrical)	Asstt. Engineer (Elect.)
6.	Shri Kuldeep Singh Rana M.Tech(Mfg.)	Asstt. Engineer(Elect.)
	INSTRUMENTATION ENGINEERING	
1	Shri M.K. Banerjee A.M.I.E. (Electronics & Communication Engg.)	Senior Instrument Engineer
2	Shri Brajesh Singh B. Tech (Applied Electronics & Instrumentation)	Technical Officer
3	Shri Virendra Kumar B.Tech (Electronics & Instrumentation)	Technical Officer
	DESIGN & DEVELOPMENT	
1	Shri J.P. Srivastava B. Tech (Mech. Engg.) , A.N.S.I. (Sugar Engg.) M. Tech.(Energy Mang),	Chief Design Engineer
2	Shri Narendra Kumar Diploma in Mech. Engg.	Draughtsman Grade-I
3	Shri Akhilesh Kumar Pandey Intermediate, ITI	Draughtsman Grade-I
4	Shri P. Prashant A.M.I.E (Mech. Engg.) A.N.S.I (S.E.)	Draughtsman Grade-I
5	Shri Shashi Prakash Yadav Diploma in Mech. Engg.	Draughtsman Grade-III
	CHEMICAL ENGINEERING	
1	Vacant	
	ORGANIC CHEMISTRY	
1	DR. Vishnu Prabhakar Srivastava M.Sc., Doctrate(D.Phil.)	Asstt. Prof. of Organic Chemistry
2	Dr. (Mrs.) Chitra Yadav M.Sc., Ph.D.	Research Assistant

	PHYSICAL CHEMISTRY	
1	Dr. Sudhanshu Mohan M.Sc., Ph.D.	Research Assistant
	AGRICULTURE CHEMISTRY	
1	Dr. Ashok Kumar M.Sc. (Ag.), Ph.D. (Soil Science & Agri. Chem.)	Assistant Professor of Agriculture Chemistry
2	Dr. Lokesh Babar M.Sc. (Agri. Chem.), Ph.D. (Agri. Chem.)	Junior Scientific Officer (Agri.)
3	Shri Ram Krishna M.Sc. (Ag.)	Research Assistant (Sel. Grade)
	BIOCHEMISTRY	
1	Dr. Seema Paroha, M.Sc., Ph.D.	Professor of Bio Chemistry
2	Dr. Santosh Kumar M.Sc., Ph.D.	Asstt. Prof. of Bio Chemistry
3	Shri Dinesh Chandra M.Sc.	Research Assistant
4	Dr. Alka Gupta M.Sc., Ph.D.	Laboratory Assistant
	STATISTICS	
1	Shri Jawaid Alam Khan M.A.(Economics & Pol. Science) Diploma in French	Senior Statistical Officer

5. DETAIL OF COURSES

The Institute provides facilities for training the students in Sugar Technology, Sugar Engineering, Industrial Fermentation and Alcohol Technology, etc.

For all Courses;-

AGE LIMIT: - 35 years (Maximum) as on 01.07.2016 .Candidates born on or after 01.07.1981 only will be considered.

Academic year -From 1st July to 31st May.

The details of the courses of study are given below:-

5.1POST GRADUATE DIPLOMA COURSES

Course	Duration	Minimum Qualification		No. of Seats								Scope
				Vertical Reservation					Horizontal Reservation			
		Academic (All educational qualifications should be from recognized Institute/School/College/ Polytechnic/University).	Experience	General	Scheduled Castes (15%)	Scheduled Tribes (7.50%)	OBC (27%)	Total	Rural (15%)	Defense(5%)	Persons with Disabilities (3%)	
ANSI (ST) Post Graduate Diploma Course of Associateship of National Sugar Institute in Sugar Technology	Two and half academic years	B.Sc. with Chemistry, Physics and Mathematics or Bachelors Degree in Chemical Engineering.	----	35	10	05	19	**69**	10	03	02	Diploma holders of this course are usually appointed to the posts of Manufacturing Chemist, Lab In charge, etc. in Sugar Industry & other deptt. dealing with sugar including N.S.I.
ANSI (SE) Post Graduate Diploma Course of Associateship of National Sugar Institute in Sugar Engineering	One and Half academic Years	Bachelor's Degree or A.M.I.E.(from Institutions of Engineers, India) in Mechanical/ Production/ Electrical/ Instrumentation / Electronics& Instrumentation Engg.	-----	14	04	02	08	**28**	04	01	01	Diploma holders of this course are usually appointed to the posts of Asstt. Engg.etc in Sugar Industry & other Depts. dealing with sugar and sugar machinery including N.S.I.

DIFAT Post Graduate Diploma Course in Industrial Fermentation and Alcohol Technology	One academic year and 4 months practical training in a distillery or brewery.	B.Sc. with Chemistry / Applied Chem./ Industrial Chem. or Bio- Chemistry as one of the subject. or B. Tech. in Bio-Technology.	-----	14	04	02	08	**28**	04	01	01	Diploma holders of this course are usually appointed to the posts of Supervisory Chemist, etc. in distilleries, breweries & other fermentation Industries.
5.2 CERTIFICATE COURSES.												
SECC Certificate Course in Sugar Engineering	One and Half academic Years	Diploma in Engineering in Mechanical / Electrical / Instrumentation / Electronics &Instrumentation from a recognized Technical School/Polytechnic.	-----	08	02	01	04	**15**	02	01	01	The certificate holders are usually appointed to the post of Assistant Engineer in sugar factories.
SBCC Certificate course in Sugar Boiling	One off season (July to November) followed by Five months practical training from December to April in a Sugar factory	Matriculate/ High School with Science/Agriculture.	One season experience (of minimum 90 days) of pan-operation in a vacuum pan sugar factory along with Nomination.	29	09	04	15	**57**	09	03	02	The certificate holders are usually appointed to the post of Panman, Head Panman, Laboratory Chemist, etc., in sugar factories.
CCSPMM Certificate Course in Sugarcane Productivity and Maturity Management	Four months (July to October)	Intermediate with Science/ Agriculture	One year experience in a sugar factory laboratory or field work along with Nomination.	09	03	01	05	**18**	03	01	01	The certificate holders can be appointed to the posts of Supervisor, Inspector etc., in cane departments of sugar factories.
CCQC Certificate Course in Quality Control	Four month (July to October)	12 standard in Science (Physics, Chemistry and Mathematics)	----	08	02	01	04	**15**	02	01	01	The certificate holders can be appointed to the posts of Laboratory chemist, Quality Control Chemist and Laboratory In-charge etc in the major factory and related organization.

CCIIPA Certificate Course in Industrial Instrumentation & Process Automation	Five month (July to November)	Diploma in Engineering in Electronics & Instrumentation /Electrical/Electronics /Instrumentation / Electrical & Electronics/Applied Electronics & Instrumentation from a recognized Technical School/Polytechnic.	----	08	02	01	04	**15**	02	01	01	The certificate holders may get chance for appointment as Assistant Engineer/ Foreman etc in sugar factories
			Total	125	36	17	67	**245**	36	12	10	

5.3 Fellowship Diploma of the Institute (F.N.S.I.)

(a) Qualifications for admissions:-

Diploma	Admission Qualifications
(i) F.N.S.I. in Sugar Technology or Sugar Chemistry	A.N.S.I. (Sugar Tech.)
(ii) F.N.S.I. in Sugar Engineering	A.N.S.I. (Sugar Engg.)
(iii) F.N.S.I. in Fermentation Technology	D.I.F.A.T.

Application for F.N.S.I. in Sugar Technology & Sugar Engineering should be sponsored by a sugar factory for carrying out the research pertaining to this course. Similarly, application for F.N.S.I. in Fermentation Technology should be sponsored by a distillery or brewery industry for carrying out the research work pertaining to this course.

Unsponsored applications would be rejected-

(b) Duration of the Course –

For (i) & (ii) – One year or three off-seasons of four months each followed or preceded by practical training for two cane crushing seasons in a sugar factory.

For (iii)- One year followed or preceded by practical training of one year in a distillery or brewery.

(c) Rules and regulations for admission to F.N.S.I. -

1. The fellowship Diploma can be obtained by research work under the guidance of the research staff of the Institute on problems which have bearing on sugar technology, sugar chemistry, sugar engineering and fermentation technology.
2. Intending candidates may be required to appear for an interview before Selection Committee who will satisfy themselves that a particular candidate is fit for admission to this course.
3. After the student has been admitted to this course, he will be required to prepare an outline of the problem which he proposes to take up for investigation and submit it to the Director for approval.
4. Each student of F.N.S.I. (Sugar Tech, Sugar Chemistry and Sugar Engg.) will be required to work in a sugar factory during two cane seasons; in case of F.N.S.I. (Fermentation Technology) student will be required to work in any distillery for one year but no student except a nominee of a factory will be permitted to take up a salaried appointment or engage himself in private practice during the course of study.
5. Each candidate will have to submit three typed copies of his/her thesis embodying the result of his/her investigation not later than 15th November or 15th May, as the case may be, or any subsequent date which the Director may fix. The thesis will be examined by a Board of Examiners of whom one will be the officer under whom the work has been carried out and the other an external examiner, who will be appointed by the Director. After the evaluation of thesis, the Board of Examiners will conduct a viva-voce examination and make their final recommendation to the Director regarding the award of the Diploma. If a student fails to qualify for the Diploma once, he may be allowed to continue his/her work at the Institute for one or more sessions and submit a fresh thesis.
6. The thesis submitted by a candidate will be the property of the Institute and shall not be published without the permission of the Director. Publication of thesis without the permission of the Director will disqualify a student altogether for the Diploma with the same thesis.
7. An assistant working in the Institute is considered to be a student for the award of a fellowship diploma provided he/she is either an associate of the Institute or possesses an equivalent qualification. He /She can after three years of service in the Institute submit a thesis containing his/her research work which shall be considered along with the other candidate admitted to the fellowship course. The work submitted should have been carried out by him/her either independently or under the direction of research officer of the Institute. He shall be required to intimate the Director at least six months before the date of submission of thesis. He /She will be required to deposit a fee of Rs. 50.

6.TUITION AND OTHER FEES

6.1 The following are the tuition fees for the various courses:-

Sl.No	Courses	Per month (Rs.) For		
		Other than SC/ST and candidates	S.C /S.T Candidates	Foreign Nationals / PIO's candidates
1.	Fellowship of the Institute	800.00	500.00	
2.	Associateship of the Institute in Sugar Technology	800.00	500.00	3200
3.	Associateship of the Institute in Sugar Engineering	800.00	500.00	3200
4.	Industrial Fermentation and Alcohol Technology	800.00	500.00	3200
5.	Sugar Engineering Certificate Course	800.00	500.00	
6.	Sugar Boiling Certificate Course	800.00	500.00	
7.	Certificate Course in Sugarcane Productivity & Maturity Management	800.00	500.00	
8.	Certificate Course in Quality Control	800.00	500.00	
9.	Certificate Course in Industrial Instrumentation & Process Automation	800.00	500.00	

6.2 In addition to the above monthly tuition fees, the students will have to pay, at the time of Admission, fees and deposits as detailed below:-

Sl.No	Item	Fee/ Deposit Amount(Rs.)
	1	**2**
1	**Caution Money deposit (Refundable)**	800.00
2	Annual Subscription for Scientific Society	300.00
3	Annual Games fees	600.00
4	Annual Subscription for Cultural Society	600.00
5	**Examination Fees- per session for all courses**	500.00
6	Common Room fees per year	600.00
7	Alumni fees	250.00
8	Medical fees per six month	50.00
9	**Hostel fees:**	
	a. Hostel Admission fees	200.00
	b. Room rent per month: Single Occupancy	300.00
	c. Room rent per month: Double Occupancy	200.00
	d. Electricity & water charges per month Single Occupancy	150
	e. Electricity & water charges per month Double Occupancy	100
	f. Hostel caution money **(Refundable)**	800.00
	g. Hostel crockery fee per term (Six months)	300.00
	h. Hostel mess advance per month	2200.00
	i. Hostel Establishment	
	• DIFAT & ANSI(ST- I yr)	1800.00
	• Others	1500.00
10	Convocation fees	500.00
11	Identity Cards Fees	50.00

Note:-1. The students will have to pay fees etc. as given in 6.1 & 6.2 in advance for each year.

2. In case any student discontinues his studies after deposition of scheduled fees, only caution money deposit [Item 6.2 (1)] and hostel caution money [Item 6.2 (9) (d)] are refundable

6.3 The total amount payable by the students of the different courses would be as follows:-

Sl. N0	Courses	Total amount payable (Rs.)			
		Terms/ Period	Other than SC/ST and candidates	S.C /S.T candidates	Foreign Nationals / PIO's / candidates
	1	2	3	4	
1.	Fellowship Diploma of the Institute **(F.N.S.I.)**	First Term	27750	25950	
		Second Term	24650	22850	
		Third Term	24650	22850	
2.	Associateship of National Sugar Institute in Sugar Technology **[A.N.S.I.(ST)]**	First Year	46900	43300	75700
		Second Year	33300	29700	62100
		Third Year	23250	21450	37650
3.	Associateship of National Sugar Institute in Sugar Engineering **[A.N.S.I.(SE)]**	First Year	35300	31700	64100
		Second Year	25150	23350	39550
4.	Diploma Industrial Fermentation and Alcohol Technology **(DIFAT)**	First Year	40300	36700	69100
		Second Year	18100	16900	27700
5.	Sugar Engineering Certificate Course **(SECC)**	First Year	46250	42650	
		Second Year	21700	20200	
6.	Sugar Boiling Certificate Course **(SBCC)**	Full Period	29900	26300	
7.	Certificate Course in Sugarcane Productivity & Maturity Management**.(CCSPMM)**	Full Period	20850	19650	
8.	Certificate Course in Quality Control**(CCQC)**	Full Period	20850	19650	
9.	Certificate Course in Industrial Instrumentation & Process Automation **(CCIIPA)**	Full Period	24300	22800	

NOTE:- ABOVE COURSE FEES ARE SUBJECT TO REVISION

7. SCHOLARSHIPS AND AWARDS

Scholarships and awards are available for different courses of study as listed below:-

7.1 For Students of Associateship course in Sugar Technology [A.N.S.I.(S.T.)]

SL.No	Donor	No of Scholarship /Awards	Value	Basis of award	
				Position	Exam-inations
1.	Government of India, Ministry of Consumer Affairs, Food & Public Distribution.	1	Rs. 150 per Month	1st in the order of merit	First year
2.		1	Rs. 100 per Month	2nd in the order of merit	First year
3.	Indian Sugar Mills Association New Delhi.	1	Rs. 14000 in lump sum	1st in the order of merit	First year
4.	Indian Sugar Mills Association New Delhi.	1	Rs. 7000 in lump sum	2nd in the order of merit	First year
5.	National Federation of Co-operative Sugar Factories	1	Rs. 3000 in lump sum	1st in the order of merit	Final year
6.	National Sugar Institute	1	Mahatma Gandhi Memorial Gold Medal	1st in the order of merit	Final year
7.	Late (Shri) S.N. Gundu Rao Memorial Scholarship	1	Rs. 150 per Month	1st in the order of merit	First year
8.	Late (Dr.) Kripa Shankar Memorial Scholarship	1	Rs. 300 per Month	Highest marks in Sugar Tech.	First year
9.	Shree Ji Future Leader Award by Shree Ji Process Engg. Works Ltd., Mumbai	1	Rs. 10000 and Trophy	**a.** Outstanding academic performance **b.** Participated Enthusiastically in various extra curriculum activity	First year

7.2 For Students of Associateship Course in Sugar Engineering [A.N.S.I. (S.E.)]

SL.No	Donor	No of Scholarship /Awards	Value	Basis of award	
				Position	Exam-inations
1.	Government of India, Ministry of Consumer Affairs, Food & Public Distribution.	4	Rs. 300 per Month	In the order of merit from the selection test	-
2.	Indian Sugar Mills Association New Delhi.	1	Rs. 11000 in lump sum	1st in the order of merit	First year
3.	Indian Sugar Mills Association New Delhi.	1	Rs. 6000 in lump sum	2nd in the order of merit	First year
4.	Shree Ji Future Leader Award by Shree Ji Process Engg. Works Ltd., Mumbai	1	Rs. 10000 and Trophy	**a.** Outstanding academic performance **b.** Participated Enthusiastically in various extra curriculum activity	First year

7.3 For Students of Diploma in Industrial Fermentation & Alcohol Technology[D.I.F.A.T.]

SL. No	Donor	No of Scholarship /Awards	Value	Basis of award	
				Position	Exam-inations
1.	Indian Sugar Mills Association New Delhi.	1	Rs. 10000 in lump sum	1st in the order of merit	Final

7.4 General Rules applicable to all Scholarships:—

(a) All scholarships are subject to filling a bond by the candidates so as to ensure that the purpose for which the scholarship is granted is fulfilled, failing which the money received is required to be refunded.

(b) The scholarship is paid subject to satisfactory progress having been made and attendance being regular.

(c) The scholarship is paid from the date on which the scholar actually joins the institute or from any other subsequent date from which the scholarship is payable after the commencement of the session. It is ordinarily tenable for the full period of the academic session.

(d) A student cannot be recipient of more than one scholarship at a time.

(e) Scholarships are subject to cancellation at any time in the event of any misconduct or irregularity on the part of the scholar.

(f) If the number of students eligible for a particular category of Scholarship/Award exceeds the available number of Scholarship/Award of that category, the amount of Scholarship/Award will be equally distributed among the students eligible for Scholarship/Award .Those who are already in employment will not be entitled for any scholarship.

8. INSTRUCTIONS TO CANDIDATES & ENTRANCE EXAM SCHEDULE

8.1 General Instructions:-

1. All rights for change of rules & regulations, Institute fees including number of seats etc., provided in this prospectus are reserved with the Institute and these can be changed any time without giving any notice or making any correspondence in this regard with any one. In case of doubts or discrepancy the content of the English version of the prospectus shall be treated as final.

2. Before applying for admission, candidates should ensure that they possess the minimum qualifications required for the courses and if they are applying for a particular category they possess the proper certificates for that category complete in every respect as per the desired norms failing which their admission is liable to be cancelled.

3. Canvassing in any form will disqualify the candidate; hence no recommendations should be forwarded to the Director or any other Officer of the Institute.

4. All candidates will have to make their own arrangements of boarding and lodging for written test or interview and no T.A. etc. is admissible.

5. Candidates are required to bring all original certificates/degrees /diplomas and testimonials at the time of interview / counseling for admission.

6. For admission of Foreign Nationals / PIO's / Children of Indian workers in the gulf countries, in the A.N.S.I. (S.T.), A.N.S.I. (S.E.) and D.I.F.A.T. courses ,15 % seats shall be allowed on supernumerary basis . Eligibility criterion of age and qualification etc., as specified in the prospectus for various courses shall apply to these candidates also.

7. The knowledge of written and spoken English is a must for foreign candidates.

8. Hostel is compulsory for students and they will essentially have to reside in hostel. However, in extreme circumstances, relaxation may be provided by the Director.

8.2 For Candidates of A.N.S.I. (Sugar Technology), A.N.S.I. (Sugar Engineering), D.I.F.A.T., S.E.C.C., S.B.C.C., C.C.Q.C. & C.C.I.I.P.A. Courses

1. The candidates who have appeared in the Final examination of minimum prescribed qualification for A.N.S.I.(Sugar Technology)/A.N.S.I. (Sugar Engineering)/ D.I.F.A.T. / S.E.C.C., C.C.Q.C. & C.C.I.I.P.A. Courses can also apply for admission.

2. However they are required to provide the self attested copy of the original mark sheet or Internet Mark Sheet duly verified by the University of the Final Examination Result at the time of counseling failing which they will not be admitted and no relaxation is possible to be given on this account. But they are required to submit, self attested copies of rest of the mark sheets (each year/semester of B.Sc./B.E./ Diploma) along with application form.

3 The entrance examination for admission to A.N.S.I. (Sugar Technology), A.N.S.I. (Sugar Engineering), D.I.F.A.T., S.E.C.C., S.B.C.C., C.C.Q.C., C.C.S.P.M.M. & C.C.I.I.P.A. courses will be held in **June 2016 as per programme given below.**

Entrance Exam Schedule:-

(a) A.N.S.I (SUGAR TECH.) , CCQC , SECC, C.C.I.I.P.A.

DATE	TIME	SUBJECT
12.06.2016	09:00 AM. to 12:00 NOON.	As per syllabus given in Prospectus

(b) A.N.S.I (SUGAR ENGG.) , DIFAT, SBCC, CCSPMM

DATE	TIME	SUBJECT
12.06.2016	02:00 PM. to 05:00 PM.	As per syllabus given in Prospectus

4 Question papers for the admission test will be bilingual i.e. both in Hindi and English. Candidates will have the option to answer the questions in either of the language.

5 For counseling, provisionally selected and wait listed candidates will be informed on our web site **http://nsi.gov.in** .They can also see the result of selection on the website of the Institute.

6 Candidates already employed in the Sugar Industry /Distillery will not be allowed to work in their factories during the 1st year of A.N.S.I.(S.T.) /D.I.F.A.T

7 Application forms for S.B.C.C & C.C.S.P.M.M. courses should be accompanied by the nomination form duly completed and signed by competent authority under his seal, as mentioned in the prescribed form.

8 Applicants are advised not to give any undertaking to the nominating factory in the matter of training or employment as during their tenure at the Institute they will be guided by the rules, regulations and arrangement made by the Institute.

9 Mobile Phone is not allowed inside Examination Hall.

9. GUIDELINES FOR FILLING THE APPLICATION FORM ON LINE

(a) 1st step: - Eligibility Checking Online (Student Registration Number Generated)
2nd step: - Application form fill-up online. After successful submission, candidate will receive computer generated filled in application form in pdf format.(One office copy & other student copy)

(b) The office copy of the application form generated from NSI website should be submitted to **Director, National Sugar Institute, Kanpur** along with the following documents:-

(i) Self attested Pass port size Photograph pasted on plain paper

(ii) Self Attested copy of the certificate as proof for **Date of birth.**

(iii) Demand draft towards the application fees.

(iv) Self Attested copies of the mark sheets. **[For each Year / Semester of B.Sc./B.E., etc.]**

(v) Original copy of the **Nomination Form** generated from NSI website at the time of submission of form. **[Compulsory for SBCC and CCSPMM students only]**

(vi) For **S.C./S.T. category** candidates, Self attested copy of certificate from appropriate authority in the rank of D.M./Collector/S.D.M./Tehsildar, with legible seal should be submitted.

(vii) For **OBC (NCL) category** candidates, self attested copy of certificate from appropriate authority in the rank of D.M./Collector/S.D.M./Tehsildar, with legible seal should be submitted. The Certificate should be issued after 31.03.2015.

(viii) For candidates belonging to **RURAL CATEGORY,** the certificate must be given in prescribed form generated from NSI website at the time of submission of form.

(ix) For candidates belonging to **DEFENCE CATEGORY**, are required to submit the self attested copy of certificate from Secretary, Kendriya Sainik Board, Delhi/Secretary, Rajya/ZilaSainik Board /Officer In-charge, Records office/Ist Class Stipendary Magistrate.

(x) For candidates belonging to **PERSONS WITH DISABILITIES,** the self attested copy of certificate should be on the letter head duly signed by the Chief Medical Officer with seal.

(xi) Experience certificates should be submitted on the official letter head of Factory only. **[Compulsory for SBCC &CCSPMM only]**

(xii) **Admit card** will be available online from NSI website.

IMPORTANT DATES AND INFORMATION FOR ON-LINE APPLICATION	
On- line submission of application forms:	From Monday, 21ST March 2016 (10:30 A.M)
Last date for submission of On-line Applications:	Friday 6th May 2016 (5:00 PM)
Last date for receipt of downloaded print outs of duly filled & signed application forms at NSI Kanpur:	Monday 16Th May 2016 (5:00 PM)
Application Fee –For all candidates except SC/ST:	Rs. 1000/-
Application Fee – for SC /ST Candidates:	Rs. 800/-
Application fee to be sent in the form of DD drawn in favour of :	**"Director, National Sugar Institute"** payable at Kanpur
Downloading of Admit Cards from web site by all applicants :	From Friday, 30th May 2016 (10:30 A.M) onwards
Admission Test for ANSI (ST), ANSI (SE), DIFAT, SECC, SBCC, CCQC, CCSPMM & CCIIPA.	12th June 2016 (Sunday) to be held at Pune Chennai , Delhi , Kanpur, Kolkata & Patna
Address for all Correspondence /Submission of on line application form by Reg. Post:	**Director, National Sugar Institute, Kalyanpur, Kanpur-208017 E-Mail: nsikanpur@nic.in**
For further details and Prospectus visit:	website: http://nsi.gov.in

10. GUIDELINES FOR FILLING THE APPLICATION FORM OFF LINE

The application form should be submitted to **Director, National Sugar Institute, Kanpur before the last date** along with the following documents:-

(i) Self Attested copy of the certificate as proof for **Date of birth.**

(ii) Demand draft towards the application fees.

(iii) Self Attested copies of the mark sheets. **[For each Year / Semester of B.Sc./B.E. etc.]**

(iv) Original copy of the **Nomination Form[Compulsory for SBCC and CCSPMM students only]**

(v) For **S.C./S.T. category** candidates, Self attested copy of certificate from appropriate authority in the rank of D.M./Collector/S.D.M./ Tehsildar, with legible seal should be submitted.

(vi) For **OBC (NCL) category** candidates, Self attested copy of certificate from appropriate authority in the rank of D.M./Collector/S.D.M./Tehsildar, with legible seal should be submitted. The Certificate should be issued after 31.03.2015.

(vii) For candidates belonging to **RURAL CATEGORY,** the certificate must be given in prescribed form.

(viii) For candidates belonging to **DEFENCE CATEGORY**, are required to submit the self attested copy of certificate from Secretary, Kendriya Sainik Board, Delhi/Secretary, Rajya/ZilaSainik Board /Officer In-charge, Records office/Ist Class Stipendiary Magistrate.

(ix) For candidates belonging to **PERSONS WITH DISABILITIES,** the self attested copy of certificate should be on the letter head duly signed by the Chief Medical Officer with seal.

(x) Experience certificates should be submitted on the official letter head of Factory only. **[Compulsory for SBCC & CCSPMM only]**

(xi) **Admit card** will be available online from NSI website and Admit cards will also be sent by post.

IMPORTANT DATES AND INFORMATION FOR OFF LINE APPLICATION	
Sale of application form and syllabus against cash payment :	From Monday, 21st March 2016 (10:30 A.M) to Friday 06thMay 2016(5:00 PM)
Last date for receipt of Money Order at NSI Kanpur for Sale of application form and syllabus against money order:	Friday 15th April 2016
Last date for receipt of duly filled application form by hand or by registered post at NSI Kanpur	Friday 06th May 2016 (5:00 PM)
Application Fee –For all candidates except SC/ST	Rs. 1000/-
Application Fee – for SC /ST Candidates	Rs. 800/-
Application fee to be sent in the form of DD drawn in favour of	**"Director, National Sugar Institute"** payable at Kanpur
Downloading of Admit Cards from web site by all applicants	From Friday, 30th May 2016 (10:30 A.M) onwards
Admission Test for ANSI (ST), ANSI (SE), DIFAT, SECC, SBCC, CCQC, CCSPMM & CCIIPA.	12, June 2016 (Sunday) to be held at Pune, Chennai , Delhi , Kanpur, Kolkata, & Patna
Address for all Correspondence/ sending Money Order /submission of off line application form by Reg. Post.	**Director, National Sugar Institute, Kalyanpur, Kanpur-208017 E-Mail: nsikanpur@nic.in**
For further details and Prospectus visit.	website: **http://nsi.gov.in**

11. SYLLABUS FOR ENTRANCE EXAMINATION

A.N.S.I. (SUGAR TECHNOLOGY) COURSE-2016

MATHEMATICS SECTION –A

1 **ALGEBRA AND TRIGONOMETRY** Group, Permutation groups , Subgroups, Centre and Normalizer, Cyclic groups, Coset decomposition, Lagrange's theorem, Homomorphism and Isomorphism, Cayley's theorem , Normal Subgroups, Quotint group, Fundamental theorem of Homomorphism, Sequence and its convergence, Convergence of infinite series, Comparison test, Ratio test, Root test, Raabe's test, Logarithmic test. Alternating series, Leivnitz test, Absolute and conditional convergence.
Complex functions, Seperation into real and imaginary parts, Exponential, Direct and inverse trigonometric and Hyperbolic functions, Logarithmic functions.

2 **MATRICES-** Addition and multiplications, elementary row and column operations, rank determination, solution of system of linear equations, Eigen values and Eigen vectors, Cayley-Hamilton theorem.

3 **CALCULUS-** Standard functions, limits. Continuity, properties of continuous functions in closed intervals, differentiability. Mean Value theorem, Taylor's theorem. Maxima and Minima, properties of tangent and normal, curvature, asymptotes, double points, points of inflexion and tracing, Fundamental theorem of integral calculus, method of integration, Rectification, Quadrature, volume and surface of solids of revolution. Partial differentiation and its application. Double and Triple integration, Application of area, volume, centre of mass, moments of inertia etc. Simple test of convergence of series of positive term, alternating series and absolute convergence.

4 **DIFFERENTIAL EQUATIONS**-Ordinary differential equations of first order, singular solutions, geometrical interpretations, linear differential equations with constant coefficients.

5 **GEOMETRY**-Analytical Geometry of straight lines and conics referred to Cartesian and Polar coordinates. Three dimensional geometry for planes, straight lines.

6 **MECHANICS-** Velocity and acceleration along radial and transverse direction and along tangential and normal directions. Simple Harmonic Motion, Inverse Square Law, **Projectiles** .Common centenary and centre of Gravity.

7 **MATHEMATICAL STATISTICS-** Discrete and continuous distributions (Binomial, Poisson's and Normal Distributions), Moments, Correlation and simple linear Regression.

8. VECTOR ALGEBRA AND VECTOR CALCULUS- Vector addition, scalar multiplication and vector multiplication (multiplication of three and four vectors also), applications in geometry, vector Differentiation, Gradient, Divergence and curl and their applications.

CHEMISTRY SECTION- B

GENERAL & PHYSICAL CHEMISTRY

1. Chemical equilibrium- Homogeneous and heterogeneous system, equilibrium constant, effect of temperature on equilibrium constant; Law of mass action ; definition, verification and its application to simple homogeneous and heterogeneous systems. Le Chateleir & Braun's Principle, its application.
2. Colloids – General method of preparation, properties and uses of colloids; Lyophillic and Lyophobic sol, charge on colloidal particles; Stability, protection and coagulation of colloids; Gold number and its application, Tyndall effect, Brownian Movement.
3. Electrochemistry- Specific, Equivalent and Molar conductivities. Ionic conductance, ionic mobility, Kohlrausch Law. Transport number and its determination. Solubility of sparingly soluble salts. Electrode potential and Nernst equation, Reference electrodes, Description and working of hydrogen and glass electrodes and their use in pH determination. Common ion effect, solubility product and its application.
4. Chemical Kinetics- Molecularity and order of a reaction, Derivation of rate constant of first and second order reaction.
5. Catalysis, characteristics, classification, homogeneous, heterogeneous catalysis, enzyme catalysis and miscellaneous examples.

ORGANIC CHEMISTRY

1. Optical and Geometrical isomerism, asymmetric carbon atom, racemisation and resolution of racemic mixtures, resonance and its application in organic chemistry.
2. Methods of preparation, properties and uses of alcohols, aldehydes, ketones, esters, ethers, amines, amides, amino acids and proteins.
3. Carbohydrates- Classification, structure of D-glucose and fructose (open and ring structure), inter-conversion of monosaccharides: aldose to ketose, ketose to aldose, pentose to hexose, hexose to pentose, Killiani's synthesis, Wohl's degradation, epimerization. Disaccharides-manufacture of sucrose, structure and their common reaction, Polysaccharides.
4. Benzene and its structure. Simple reactions of benzene, toluene, phenols, nitro and amino compounds, benzoic, salicylic, cinnamic & sulphonic acids, aromatic aldehydes and ketones, diazo, azo compounds, naphthalene, pyridine, thiophene and furan.
5. Orientation and structure of Benzene.

INORGANIC CHEMISTRY

1. Periodic properties- Ionization potential, Electron Affinity, Electro Negativity, Atomic and Ionic-radii, hybridization, Polarization.
2. Oxidation states and oxidation number, common oxidizing and reducing agents, ionic equations and balancing of chemical reactions by oxidation- reduction method.
3. Coordination compounds-double and complex salts, Definition: complex-ion coordination number, nomenclature. Werner's theory of complexes, effective atomic number, stability of complexions, Stability constant, factors affecting stability, valence bond theory, crystal field theory of complex compounds, methods of study of complexes.
4. Principles of inorganic chemical analysis.
5. Study of d-Block elements and little bit about Lanthanoid-contraction.
6. Metal Carbonyl and idea of Balk bending.

PHYSICS - SECTION- C

1. **MECHANICS and WAVE MOTION:**—Dynamics of particle in rectilinear and Circular Motion, Linear and angular momentum. **Moment of inertia, theorem of parallel and perpendicular axes,** Rotation energy and rotation inertia for simple bodies, combined translational and rotational motion of rigid body on horizontal and inclined planes, Relations between elastic constants, Bending of beam, Torsion of cylinder, Law of gravitation, Kepler's laws, Geo-stationary satellites. Differential equation of Simple harmonic motion, Damped and forced vibrations,Composition of S.H.M., stationary waves, Phase and group velocity.

2. **THERMODYNAMICS:-**Equipartition of energy, specific heat of mono-atomic, diatomic and triatomic gases, adiabatic expansion, Vander Waal's gas equation of state, critical constants, Joule-Thomson expansion, principle of re-generative cooling. Laws of thermodynamics, Carnot cycle, Carnot theorem, Entropy, thermodynamical scale of temperature, Clausius- Cleyperon equation, Adiabatic demagnetization, Black body. Stefan-Bolzman Law, Kirchoff's Law, plank's law.

3. **OPTICS & LASERS**: Principle of superposition, Interference, Coherence, Lateral shift of fringes, localized fringes, thin films. Michelson interferometer, Determination of wave length, Fresnel half period zones, Straight Edge, Diffraction Grating, Rayleigh criterion of resolution, Polarization, Double refraction in uniaxial crystals, Nicol Prism, Retardation Plates, Optical Activity, Polarimeter, its principle and applications, Laser action, population inversion, application of Lasers.

4. **Electricity of Magnitism:** Growth and decay of current through inductive resistances, charging and discharging & R-C & RLC circuits, Time constant,Coulombs Law, Electric field and potential due to uniform charged sphere, Gauss law and its applications, Electric dipole energy of a condenser, Magnetic field, Magnetic force of a current, Laws of Induction, Faraday and Lenz's Law, Bio-savart Law, Lorentz force, Mutual and self-induction, Moving Coil Ballistic Galvanometer, Dielectric constant, Polarization Properties of dia, para and ferromagnetic materials, curie temperature, Hysteresis.

5. **QUANTUM MECHANICS:** Photo-electric phenomenon, Compton effect, wave particle duality, de Broglie matter wave, Heisenberg Uncertainty principle, Schrodinger wave equation, interpretation of wave function, spectra of hydrogen, continuous x-ray, Mosley Law, X-ray absorption spectra ,Discrete set of electronic energies of molecules.

6. **RELATIVITY:** Reference systems, Inertial frames, Galilean invariance and conservation laws, Propagation of light, Michelson-Morley Expt. Lorentz transformation, length contraction, time dilation, variation of mass with velocity, mass –energy equivalence.

7. **STATISTICAL PHYSICS:** Probability and thermodynamic Probability, Probability and Entropy, Boltzman Entropy relation, statistical interpretation of second Law of thermodynamic, Bose-Einstein and Fermi-Dirac distribution.

8. **NUCLEAR PHYSICS:** Atomic Nuclear and its properties, mass deflect and binding energy, structure of nuclear, Fission and Fusion.

9. **SOLID STATE ELECTRONICS:** Semi conductor, p-n junction diode and its characteristics, Avalanche and zener break down, Rectifier, LED, p-n-p and n-p-n transistors and their characteristics, curves , Hall effect, Amplifiers, R-C coupled amplifier, common ammeter amplifier, common-base amplifier and common collector amplifier. Transistor as an oscillator, Hardley oscillator, FET and MOSFET . Motion of a charged particle in electric and magnetic field, cathode ray oscillograph.

CHEMICAL ENGINEERING SECTION –D

(1) Process Calculation: Law of conservation of mass and energy, Recycle, by pass and purge, its calculation, degree of freedom analysis**.** Ideal gas law, Dalton's law, Amagat's law, Average molecular weight of gaseous mixture, Vapour pressure, Raoult's law and Henry's law.

(2) Thermodynamics: First and second Law of thermodynamics and their application. Equation of state and thermodynamic properties of ideal Gases and Real system, phase equilibria, fugacity, mixture properties, chemical reaction equilibria. Maxwell relations, Thermodymic relations, Gibb's phase rule, Carnot cycle, Enthalpy and Entropy.

(3) Fluid Mechanics and Mechanical Operation: Fluid statics, Newtonian and Non-Newtonian fluids, Bernoulli equation, flow through pipe line system. Flow meters, Pump and compressors, Flow through packed and fluidized bed. Size reduction and size reparation filtration, mixing and agitation.Entrance and exit losses in flow process, Rayleigh's method of dimensional analysis, Buckingham pi theorem.

(4) Heat Transfer: Conduction, convection and radiation, Heat transfer coefficient including boiling, condensation and evaporation systems , type of heat exchangers and evaporators and their design**,** Radiation, Basic laws, Black body and Grey body concepts, Furnaces, their classification, principle and design criteria.

(5) Mass Transfer and Transport Phenomenon: Fick's Law, Film Penetration and Surface renewal theories. Momentum heat and mass transfer analogies, distillation, absorption leaching, liquid-liquid extraction, crystallization, drying, adsorption,

(6) Chemical Reaction Engineering: Theories of reaction rates, single and multiple reactions in ideal reactors, kinetics of homogeneous reactions, Interpretation of kinetic data.Catalysis and enzyme catalysis, Transport number, Kohlrausch's law, solubility product, redox reaction. Electrochemical & concentration cell.

Question paper will consist of Four sections i.e. Mathematics, (weightage 20%), Chemistry (weightage 40%) & Physics (weightage 20%) & Chemical Engineering (weightage 20%). Each section will be of equal marks. In each section questions shall be of objective, short answer and long answer type. Candidates may attempt all the sections.

12. SYLLABUS FOR ENTRANCE EXAMINATION

A.N.S.I.(SUGAR ENGG.) COURSE - 2016

MECHANICAL ENGINEERING &PRODUCTION ENGINEERING SECTION – A

1. **Basic concept s and Laws of thermodynamics:**Definitions, microscopic and macroscopic properties, Zeroth law, First law, Second law of thermodynamics, Intensive and extensive properties, quasi-static, reversible, irreversible, flow, non-flow, steady flow, throttling processes, Carnot cycle, etc.
2. **Combustion of fuels :**Classification fuels, merits and demerits of liquid, solid and gaseous fuels, calorific value of fuels (HCV and LCV), combustion equations of fuels, minimum volume of air required for complete combustion, gravimetric analysis, conversion of mass analysis to volumetric analysis, excess air, flue gas analysis by Orsat apparatus.
3. **Properties of steam, steam generators, steam turbines and condensers:**Formation of steam, steam tables, Enthalpy and entropy of wet and superheated steam, temperature – entropy and pressure and volume diagrams for steam, constant pressure, constant volume, adiabatic, isothermal, polytropic processes, dryness fraction, Mollier diagram, Types of boilers, functioning, boiler mountings and accessories, performance of boilers, draught in boilers, calculation of chimney diameter, height and efficiency, classification of turbines and principle of operation, compounding , performance of turbines, governing, lubrication system for steam turbine, Classification of condensers, vacuum measurement, mass of cooling water required, air removal, vacuum efficiency etc.
4. **Internal combustion engines, air compressors, Gas turbines:**Classification of I.C. Engines, cyclic operations, Two stroke and four stroke cycle engines, Valve timing diagrams, scavenging, detonation, Rating of Engine fuels (Octane number and Cetane Number), cooling super charging, lubrication, carburetor, governing, spark plug, fuel pump, atomizer, etc.
5. **Heat transfer:**Conduction, thermal conductivity, conduction through flat wall, hollow cylinder, composite cylinder, sphere, convection, free and forced convection, LMTD, heat exchanger, radiation, absorption, reflection and transmission of radiation, plank's Law, Stefan-Boltzman's law, heat transfer coefficient for radiation.
6. **Mechanical engineering design:**Engineering materials and their properties, simple stresses in machine parts, torsional, bending and variable stresses in machine parts, pressure vessels, pipes and pipe joints, welded joints, screwed joints, keys and couplings, shafts, levers, columns and struts, belt and rope drives, fly wheel, bearings, spur, helical and worm gears, etc.
7. **Manufacturing technology:**Manufacturing cycle, manufacturing processes and their selection, engineering materials and their selection, casting, product design, defects, inspection techniques, casting processes, basic design considerations in casting, plastic deformation, hot and cold working, sheet metal operations, heat treatment processes, metal cutting, tool materials, tool geometry, and nomenclature, cutting fluids, single and multipoint cutting operations, production of gears and screw threads, grinding and finishing process, machines tools, introduction to NC, CNC and DNC machining, joining processes, welding process, testing of welded joints, brazing and soldering, mechanical fasting processes, etc.
8. **Computer aided manufacturing and manufacturing automation**
   Computer aided design of engineering systems, applications in modeling analysis, design and manufacturing, computer graphics, geometric transformations, computer aided drafting, surface and solid models, customizing, auto cad, lisp, design of surfaces, solid modeling, finite element analysis, definition of automation, reasons for automating, pros and cons of automation, manufacturing operations and automation strategies, production economics, high volume production systems, numerical control production systems i.e. CNC, DNC and adoptive control, industrial robots, automated material handling, storage and retrieval systems, automated inspection and testing principles and methods, sensor technologies for automated inspection, etc.

ELECTRICAL ENGINEERING SECTION B

1. **Electromagnetic Induction:**Relation between magnetism and electricity, production of induced emf and current, Faraday's law of electromagnetic induction, Lenz's law, types of induced emf, coefficient of self inductance, and mutual inductance, coefficient of coupling, Inductances in series and in parallel.
2. **A.C. Fundamentals:**Generation and equations of alternating voltage and current, wave form, cycle, time period frequency, amplitude etc, different forms of emf equation, phase, phase difference, R.M.S. value of half wave rectified, phasor representation of alternating quantities, A.C. through resistance, inductance and capacitance.
3. **A.C. Circuits:**Series A.C. circuit, power factor, active and reactive components of circuits, current, Q-factor of a coil, power in an iron cored choking coil, resonance in R.L.C. circuit, graphic representation of resonance, resonance curve, Q-factor of series circuit, parallel A.C. circuits, Vector and phasor method, application of admittance method, complex or phaser algebra, series – parallel circuits, parallel equivalent of a series circuit, resonance in parallel circuit, phase sequence, parallel circuit, polyphase circuits, generation of three phase velocity, Q-factor of a sequence, numbering of phase, inter connection of three phase, star/delta connection, power factor improvement, power measurement in 3 phase circuit, phase sequence indicators.
4. **D.C. Generators:**Principles, working and construction, types of generators, generated emf and emf equation, losses, efficiencies, characteristics of DC generators, no lead curve, critical resistance, critical speed, voltage built up of shunt generators, series generators, compound generators, application of generators.
5. **D.C. Motors:**Principle, comparison with generators, significance of back emf, voltage equation, torque, speed regulation, motor characteristics, performance curves, losses, power stages and efficiency.
6. **Transformer:**Principle of working, construction, emf equation, voltage transformation ratio, losses, equivalent circuit, and approximate equivalent circuit, transformer tests, regulation efficiency, auto transformer, equal and unequal voltage ratio, three phase transformer, connections, parallel operation phase conversion, current transformer, potential transformer.
7. **Induction motors:** Classification, principle and construction, slip frequency of motor current, relation between torque and rotor, power factor, starting torque, effect of change in supply voltage, rotor emf and resistance under running conditions, torque under running conditions, relation between torque and slop, measurement of slop, power stages, rotor output.
8. **Alternator:**Basic principle, construction armature windings, connections, pitch factor, distribution factor, equation of induced emf, effect of harmonics on pitch and distribution factors, vector diagram of a loaded alternator, voltage regulation, three phase alternators parallel operation of alternators, synchronizing of alternators, synchronizing current power and torque, effect of unequal voltage distribution of load.
9. **Power system components:**Single line diagram of power system, brief description of power system elements : synchronous machine, transformer, transmission line, busbar, circuit breaker and isolator, concepts of FACTS.
10. Transmission of Electricity.

INSTRUMENTATION AND ELECTRONICS, SECTION –C

1. Basic concepts of measurements, system configuration, accuracy, precision, error, linearity, hysteresis, resolution, threshold, span, calibration, dead zone.
2. Electrical Transducer.
3. Measurement of displacement by LVDT and strain guage.
4. Measurement of pressure, vacuum, temperature, flow, level, pH, conductivity, viscosity.
5. Measurement of force and torque.
6. Data acquisition, A to D converter, D to A converter, signal conditioner, multiplexer, demultiplexer.
7. Digital signal transmission and processing.
8. Microprocessor basics, Microcontroller fundamentals.
9. Basic Electronics: Diode, Triode, Transistor, Amplifier, Rectifier, Zener Diode, Voltage Regulator, Thyrister (SCR), TRIAC, Logic gates and its applications.
10. Introduction to Electronic communication.
11. Introduction to data communication and networking.

PROCESS CONTROL

Measurement of process variables; sensors, transducers and their dynamics, transfer functions and dynamic responses of simple systems, process reaction curve, controller modes (P, PI, and PID); control valves; analysis of closed loop systems including stability, frequency response and controller tuning, cascade, feed forward control.

Question paper will consist of three sections i.e. Mechanical Engineering and Production Engineering (weightage 50%), Electrical Engineering (weightage 25%) & Instrumentation and Electronics Engineering (weightage 25%). Each section will be of equal marks. In each section questions shall be of objective, short answer and long answer type. Candidates may attempt all the sections.

13. SYLLABUS FOR ENTRANCE EXAMINATION

POST GRADUATE DIPLOMA COURSE IN INDUSTRIALFERMENTATION AND ALCOHOL TECHNOLOGY (D.I.F.A.T) -2016

CHEMISTRY -SECTION A

GENERAL & PHYSICAL CHEMISTRY

1. **Chemical Equilibrium**- Homogeneous and heterogeneous system, equilibrium constant, effect of temperature on equilibrium constant; Law of mass action ; definition, verification and its application to simple homogeneous and heterogeneous systems

2. **Colloids** – General method of preparation, properties and uses of colloids; Lyophillic and Lyophobic sol, charge on colloidal particles; Stability, protection and coagulation of colloids; Gold number and its application

3. **Electrochemistry**- Specific, Equivalent and Molar conductivities.Ionic conductance, ionic mobility, Kohlrausch Law. Transport number and its determination. Solubility of sparingly soluble salts.Electrode potential and Nernst equation, Reference electrodes, Description and working of hydrogen and glass electrodes and their use in pH determination.

4. **Chemical Kinetics**- Molecularity and order of a reaction, Derivation of rate constant of first and second order reaction.

ORGANIC CHEMISTRY

1. Methods of preparation, properties and uses of alcohols, aldehydes, ketones, esters, ethers, amines, amides, amino acids proteins. Carbohydrates, polysachharides & sugars.

2. Benzene and its structure. Simple reactions of benzene, toluene, phenols, nitro and amino compounds, benzoic, salicylic, cinnamic, sulphonic acid, aromatic aldehydes and ketones, diazo, azo compounds, naphthalene, pyridine, thiophene and furan.

INORGANIC CHEMISTRY

1. Periodic properties- Ionization potential, Electron Affinity, Electro negativity, Polarization.

2. Oxidation states and oxidation number, common oxidizing and reducing agents, ionic equations and balancing of chemical reactions by oxidation- reduction method.

3. Coordination compounds-double and complex salts, Definition: complex-ion coordination number, nomenclature. Valence bond theory, crystal field theory of complex compounds, methods of study of complexes.

4. Principles of inorganic chemical analysis.

INDUSTRIALCHEMISTRY/APPLIED CHEMISTRY- SECTION B

A. Industrial Aspects of Organic and Inorganic chemistry.

1. Nomenclature: Generic names, Trade names

2. Raw materials for organic compounds: Petroleum, Natural gas, Fractionation of crude oil, cracking, reforming, hydro forming and Isomerisation.

3. Coal: Types of coal, properties, calorific value, distillation of coal, chemicals derived from them.

4. Renewable Natural resources: Cellulose, Starch:-properties, modification, important industrial chemicals derived from them. Alcohols, oxalic acid and Furfural.

5**.**Metallurgical operations pulverization, calcination, roasting refining etc. extraction of iron, copper, lead, silver, sodium, aluminum etc.

B. **Industrial Aspects of Physical Chemistry and Material &Energy balances.**

1**. Surface chemistry and Interfacial phenomena:** Adsorption isotherm, Sols, Gels, Emulsions, Micro emulsions, Micelles, Aerosols, Effect of Surfactants, Hydrotropes.

2. **Catalysis:** Introduction, Types, Basic principles, mechanisms, factors affecting the performance, introduction to phase transfer catalysis, Enzymes catalyzed reactions- rate model, industrially important reactions.

3. **Material Balance involving chemical reactions:** concept of limiting reactant, conversion, yield, selectivity, and liquid phase reaction, gas phase reaction with or without recycle or bypass.

4. **Energy Balance:** Heat capacity of pure gases and gaseous mixtures at constant pressures, sensible heat changes in liquids, Enthalpy changes.

C. Unit operations, Fluid Flow and Heat Transport in Chemical Industry.

1. Distillation: Introduction, batch and continuous distillation, separation of azeotropes, plate columns and packed columns.

2. **Filtration:** Introduction, equipments, plate and frame filter press, Nutch filter, rotary drum filter, sparkler filter, candle filter, Bag filter.

3. **Drying:** Introduction, free moisture, bound moisture, drying curve, equipments-traydryer, rotary dryer, flash dryer, fluid bed dryer, drum dryer, spray dryer.

4. **Fluid Flow:** Fans, Blowers, Compressors, vacuum pumps, Ejectors.

5. **Heat Transfer:** Heat exchangers-Shell and tube type, finned tube heat exchangers, plate heat exchangers, refrigeration cycles.

D. Material Science and Industrial Pollution.

1**. Polymeric Materials:** Industrial polymers and composite materials–their constitutions, chemical and physical properties.

2. **Industrial pollution:** Pollutants and their statutory limits, pollution evaluation methods.

Water pollution – organic/inorganic pollutants

Pesticide pollution, Radiation pollution and Green House Effect.

E. Effluent treatment &Waste management and Process Instrumentation.

1. Principles and equipment for aerobic, anaerobic treatment, adsorption, sedimentation. Electrostatic precipitator, Mist eliminator, Wet scrubbers, Absorbers.

2. Solid waste management, Industrial safety.

3. Thermometer, pH meter, conductivity meter, manometer, barometers, pressured gauge,

F. Environmental Analysis in Process Industries.

Environmental Chemistry, determination of pH ,acidity alkalinity, total suspended solids(TSS), total dissolved solids(TDS),total hardness and Ca&Mg hardness, chloride, sulphate, nitrate, oil and grease, DO, COD, BOD chlorine demand, limit test for heavy metals-Pb,As, Hg, Fe and ash content

BIOCHEMISTRY/BIOTECHNOLOGY-SECTION C

1. **CARBOHYDRATES** Structure and properties of monosaccharide, disaccharides. oligosaccharides and polysaccharides, Mutarotation, Inversion of sucrose, colour test with sugars, Estimation of total reducing sugar by fehling solution, tests to differentiate aldehyde and ketone. Metabolism of carbohydrates including glycolysis, HMP pathway, glyoxalate cycle, TCA cycle, Entner-Duodoroff pathway, gluconeogenesis, Pasteur effect.
2. **PROTEINS** : Outline of the structure of the common amino acids present in proteins, their general properties, metabolism of amino acids including deamination, transamination and decarboxylation, physical & chemical properties, classification and structure of proteins. Isolation, purification and estimation of proteins.
3. **NUCLEIC ACIDS**: Outline of the structure & functions of purine & pyrimidine bases, nucleosides and nucleotides, structure and biosynthesis of nucleic acids. Genetic Code, Evidence & Essentiality of Codon, Triplet code, start and stop condons. Overlapping genes and reading frames, universality of genetic code, Protein synthesis, mechanism in prokaryotes, Post translational modification and cell secretion.
4. **ENZYMES:** Nature, occurrence, classification of enzymes, outline of enzyme kinetics, competitive, non-competitive and uncompetitive inhibition, enzyme activity and importance of enzymes in fermentation industry
5. **MICROBIAL GENETICS:** Conjugation, Transduction, Transformation; Isolation of auxotrophs, Replica plating techniques, Analysis of mutations in biochemical pathways.
6. **NATURE OF GENE AND BASIC GENETIC ENGINEERING:** Nature of the Gene, one gene one enzyme hypothesis, gene-protein relation, Genetic fine structure, Colinearity of gene & protein, Inducible and constitutive operons, Manipulation of DNA: denaturation of DNA by heat, reassociation of complimentary strands, Engineering: restriction enzymes, formation of recombinant DNA, vectors, cloning strategies, detection of clone genes, applications of recombinant DNA technology, PCR technology.
7. **MICROBIOLOGY**: the microscope, spontaneous generation, biogenesis, fermentation, germ theory of diseases, Microbial Diversity: Prokaryotes and Eukaryotes, Microalgae, Microfungi, Protozoa, Bacteria and Viruses, Bacterial size, shapes and pattern of arrangement, Structures external to cell wall: Flagella, Pili, Capsule, sheath, Prosthecae and stalk. The cell wall structure: Gram positive and gram negative bacteria. Structures internal to cell wall: Cytoplasmic membrane, Cytoplasmic inclusion and nuclear material. Reproduction and growth of bacteria & Yeast. Modes of cell division, Growth curve, Lag phase, Exponential phase, stationary phase and death phase, Nutritional requirements. Nutritional types of bacteria, Phototrophs, Chemotrophs, Autotrophs, Heterotrophs, Obligate parasites. Bacteriological media, Selective media, Maintenance media, Differential media. Control of microorganisms, Definitions and fundamentals of control, Physical agents / processes for control: high temperatures, low temperature, dessication, osmotic pressure, radiation, filtration, host parasite interaction: pathogenicity, virulence and infection, Defense mechanisms of host: physical barriers, chemical barriers, biological barriers, Fever, Inflammation and Phagocytosis.

Question paper will consist of three sections i.e. Chemistry (weightage 50%), Industrial Chemistry/Applied Chemistry (weightage 25%), &Biochemistry/Biotechnology (weightage 25%). Each section will be of equal marks. In each section questions shall be of objective, short answer and long answer type. Candidates may attempt all the sections.

14. SYLLABUS FOR ENTRANCE EXAMINATION

SUGAR BOILING CERTIFICATE COURSE - 2016

PAN BOILING PROCESS-SECTION-A

1. General idea about various raw materials and crops for Sugar Manufacture, their cultivation, production etc.
2. General information about the equipment & Machinery installed in mill and Boiling House.
3. An overview of the Working, Types and Design of Equipment's used for sugar manufacture: (from Milling to Sugar Bagging).
4. Basic of Steam , Vapor bleeding etc,
5. Basics of the Process of vacuum pan boiling, Types and Grades of Sugar Produced, Boiling Schemes, Massecuites, Molasses their purities, Brixes, Grain Sizes etc.
6. Preparation of A massecuite, B massecuite & C massecuite or R1,R2,& R3 etc. massecuites.
7. Methods of slurry preparation, False grain & conglomerates.
   Different instruments Used in Vacuum Pan control and their Designs.
8. Different types of Vacuum Pans used in the sugar industry, their parts, connections, etc.
9. Comparison between batch pan & Continuous pan.
10. Details of Vacuum Generation, Temperatures and Vacuum in Pans and Evaporators, usage of Condensate etc.
11. General Idea about the Working and designs of Crystallizers, Centrifugal, Grader etc.

MATHEMATICS AND SCIENCE-SECTION –B

1. Basics of Percentage, Fractions, Simple Interest, Compounds Interest, Work – Time and Speed calculations.
2. Surface Area and Volume of different shapes such as Triangle, Rectangle, Trapezium cuboids, cylinder, cone, sphere etc.
3. Fundamental and secondary units and their conversion related to Weight, Time, Length, Area, Volume, Temperature etc.
4. General Information about pressure, temperature, Volume of Gases, Gas laws, Law of diffusion, Rate of diffusion, Atmospheric pressure and its effects.
5. Laws of Force, Motion, Work, Energy, Momentum, Torque, Couple etc.
6. Evaporation, Boiling point, Freezing point, Melting point, Elevation of Boiling point, Depression of Freezing point, , Temperature Scales, Principle of Calorimeter etc.

Question paper shall consist of two sections i.e. Pan Boiling Process and Mathematics & Science. Each section will be of equal marks. In each section questions shall be of objective, short answer and long answer type. Candidates may attempt all the sections.

15. SYLLABUS FOR ENTRANCE EXAMINATION

CERTIFICATE COURSE IN QUALITY CONTROL - 2016

MATHEMATICS-SECTION A

Algebra:-

Logarithms – Properties of logarithms

Complex Number as an order pair of real numbers in the form of $a+ib$, (a,b),

Use of the formula: $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ in solving quadratic equation.

Simple problems of arithmetic, geometric & harmonic progression

Trigonometry:–

Angles: convention of sign of angles, magnitude of an angle, the relation $s = r\theta$ where θ is in radians, truth of the identity $\text{Sin}^2\text{X} + \text{Cos}^2\text{X} = 1$, relationship between trigonometric functions.

Coordinate Geometry:–

Basic concepts of points and their coordinates, slope & gradient of a line, angle between two lines, various forms of equation of lines, distance of a point from a line, distance between parallel lines. Conic sections, circle, ellipse, parabola, hyperbola and their properties.

Statistics:– Estimation of mean, median & mode. Graphical Presentation of Data

CHEMISTRY-SECTION –B

Basic concepts of chemistry – Properties of matter & their measurements, Dalton's atomic theory, laws of chemical combination, Avogadro's Hypothesis, Atoms & Molecules, chemical equivalents, volumetric and gravimetric calculation, empirical & molecular formula. Electro chemistry, with special reference to pH and conductivity measurement , theory of solutions with special reference to solubility and solubility products, common ion effect.

Surface Chemistry – Adsorption, colloidal state, emulsions & chromatography.

Chemical Kinetics – Rate of affecting rate of reaction, dependence of rate of reaction on concentration, order and molecularity chemical reaction, factors of a reactions.

Organic Chemistry & Organic compounds- Detection of elements in organic compounds (qualitative analysis), estimation of elements in organic compounds (quantitative analysis), Calculation of empirical & molecular formula.

Carbohydrates- General concept, mono, di and oligosaccharides, Reducing and Invert sugars, Specific rotations, Polarization, Polaroids. Refractrometry, and Hydrometry.

Question paper will consist of two sections i.e. Mathematics and Chemistry. Each section will be of equal marks. In each section questions shall be of objective, short answer and long answer type. Candidates may attempt all the sections.

16. SYLLABUS FOR ENTRANCE EXAMINTAION

CERTIFICATE COURSE IN SUGAR CANE PRODUCTIVITY & MATURITY MANAGEMENT - 2016

Agronomy

a) **Irrigation &water:-** Sugarcane (crops) water Requirement, Relationship of the water requirement with soil texture, control of wastage of irrigation water, quality & Effect of irrigation water.
b) **Irrigation Methods:-** Flooding Method, Thala Method, Sprinkler & Drip irrigation, Boarder Method, Limitations & benefits of each irrigation Method.
c) **Measurement of irrigation water:-**'B' Katawa & Kulawa, Hectare, cm, Meter method of measurement.
d) **Necessity of Drainage:-**Disadvantages of High Moistured soils, Land development & improvement, Land preparation, General farm management & control.
e) **Accidents:-**Flood, Cyclone, Earthquake, Sensitive Zones, Control measurement of losses.
f) Weeds & Weedicides of sugarcane.
g) Plant protection chemicals used in sugarcane with quantity and method of application.

Agriculture Botany

(a) External physiology of plants.
(b) Structure of flower & their function of different parts.
(c) Pollination
(d) Fertilization
(e) Type of Fruits
(f) Structure of seed & germination, Type of Seeds, Function & dispersion.
(g) Internal physiology of cell
(h) Plant physiology
(i) Classification of botany
(j) Microbiology of virus, Blue Green, Algae, Fungi, Bacteria, Micro- organism.

Agriculture Chemistry

(a) Inorganic Chemistry :- Classification of Elements, Hard & Soft water, Nitrogen & Nitrogen Cycle, Ammonia, Nitric Acid, Carbon, Carbon dioxide, Phosphorus & Phosphoric acid, Sulphur, Sulphur dioxide, Sulphuric acid, Chlorine, Hydrolic acid, Sodium & Potassium, Calcium, Iron & Aluminium.

(b) Organic Chemistry :- Nomenclature & Classification of Organic Compounds, Alkene or Paraffins, Alkene or olifins, Alkayne or Acetylene, Alcohol Glycerol, Aldehyde & Ketone, Carboxylic acid, Amine & Amide, Oil, Fat & Soaps, Carbohydrates, Benzene & phenol.

Question paper will consist of objective, short answer and long answer type.

17. SYLLABUS FOR ENTRANCE EXAMINATION

SUGAR ENGINEERING CERTIFICATE COURSE - 2016

MECHANICAL ENGINEERING-SECTION A

1. **STRENGTH OF MATERIALS** Stresses and Strains, Resilience, Moment of Inertia, Bending Moment and Shearing Force, Bending stresses, Columns, Torsion, Springs.
2. **THERMODYNAMICS** Fundamental Concepts, Laws of Perfect Gases, Thermodynamic Processes on Gases, Laws of Thermodynamics, Ideal and Real Gases, Properties of Steam, Steam Generators, Air Compressors, Introduction to Heat Transfer.
3. **HYDRAULICS AND PNEUMATIC SYSTEMS** Pressure and its Measurement, Flow of Fluids, Flow through Pipes, Flow through Orifices, Hydraulic Machines, Water Turbines and Pumps. Pneumatic Elements –Pipes, Air Compressors, Pneumatic Cylinders; Pneumatic Valves- Type, symbols, working, applications and selection criteria.
4. **THEORY OF MACHINES** Simple Mechanisms, Power Transmission, Flywheel, Governor, Balancing, Vibrations.
5. **CNC MACHINES AND AUTOMATION** Introduction to NC, CNC & DNC, Construction and Tooling, Part Programming, Problems in CNC Machines, Automation and NC system.
6. **PRODUCTION MANAGEMENT:** Management approach to Planning, Analysis and Control functions involved in a Production System; Production cycles, planning functions; Types of industry : Job, Batch, Continuous, Mass and Flow Productions; Organisation and policies in respect of production planning and control; Product design and development; Forecasting techniques; Scheduling, Sequencing and plant loading for optimal utilization; Queueing models and line balancing; Materials Planning and Control, Inventory Management; Value Analysis; Productivity Analysis, Mechanics of production control.

ELECTRICAL ENGINEERING -SECTION B

1. **FUNDAMENTALS OF ELECTRICAL ENGINEERING:** DC Circuits, Batteries, Magnetism and Electromagnetism, Electromagnetic Induction, AC Fundamentals, AC Circuits, Poly-Phase systems.
2. **ELECTRICAL MACHINES:** DC generators, DC motors, Transformers, Alternators, Synchronous Motors, Induction Motors.
3. **ENERGY SOURCES AND MANAGEMENT OF ELECTRICAL ENERGY:** Various energy sources, Importance of non-conventional sources of energy, present scenario, future prospects and economic criteria; Energy Conservation &Management-Energy efficiency, Need for energy efficient devices, Energy conservation in Industrial sector (Motors, Industrial lighting, Distribution system, Pumps, Fans, Blowers etc.)
4. **ESTIMATING AND COSTING IN ELECTRICAL ENGINEERING** Types of wiring, Estimating and Costing - Domestic installations, Industrial installations, Estimating the material required for Transmission and distribution lines (overhead and underground) & Substation.

5. **ELECTRICAL POWER (Generation, Transmission and Utilization)**Power Generation, Economics of Generation, Transmission Systems - Constructional features of transmission lines, Mechanical features of lines, Electrical features of lines; Substations - Switch Gears, Protection Devices Faults, Protection Scheme. Power Factor and its importance; Illumination, Electric Heating, Electric Welding, Electrolytic Processes.
6. **INDUSTRIAL ELECTRONICS AND CONTROL OF DRIVE: S**SCR and its applications, Thyristor Control of Electric Drives, Uninterrupted Power Supplies.

INSTRUMENTATION&ELECTRONICS ENGINEERING-SECTION C

1. **ANALOG ELECTRONICS** Semiconductor diode and its applications; Zener Diodes and its applications, Bipolar transistors, Transistor Biasing Circuits, Single Stage Transistor Amplifier; Field Effect Transistors.
2. **DIGITAL ELECTRONICS** Number System, Boolean algebra, Logic Gates and Families, Logic Simplification, Arithmetic circuits, Encoders, Decoders, Multiplexeres and De Multiplexeres, Sequential Circuits, Counters, Shift Register, A/D and D/A Converters.
3. **LINEAR AND DIGITAL INTEGRATED CIRCUITS** Basics of Operational Amplifiers, Op-amp with Negative Feedback, General Linear Application, Active Filters, Comparators, Timer and Multi vibrator, Oscillators.
4. **ELECTRONIC INSTRUMENTS AND MEASURMENTS** Voltage, Current and Resistance Measurement, Cathode Ray Oscilloscope, Impedance Bridges and Q Meters, Digital Instruments.
5. **TRANSDUCERS AND SIGNAL CONDITIONING** Variable Resistance Transducers, Variable Inductance Transducer, Variable capacitance Transducers, Piezoelectric Transducers, Hall effect sensor, Optical transducers, Techo-generator, Thermocouples, Principle of Analog Signal Conditioning.
6. **PROCESS INSTRUMENTATION & PROCESS CONTROL** Measurement of Pressure , Torque, Power, Speed and Force, Measurement of Stress and Strain, Measurement of Motion, Thickness Measurement, Measurement of Density, pH, Humidity and Viscosity; Basic Control Loops and Characteristics, Controller Modes and Characteristics, Electrical Control Elements, Pneumatic and Hydraulic Control Elements, Control Valves, Switches.

Question paper will consist of three sections i.e. Mechanical Engineering (weightage 50%), Electrical Engineering (weightage 25%), &Electronics Engineering/ Electronics & Instrumentation Engineering (weightage 25%). Each section will be of equal marks. In each section questions shall be of objective, short answer and long answer type. Candidates may attempt all the sections.

18. SYLLABUS FOR ENTRANCE EXAMINATION

CERTIFICATE COURSE IN INDUSTRIAL INSTRUMENTATION & PROCESS AUTOMATION- 2016

INSTRUMENTATION & ELECTRONICS ENGINEERING-SECTION A

1. ANALOG ELECTRONICS: Semiconductor diode and its applications; Bipolar transistors, Transistor Biasing Circuits, Single Stage Transistor Amplifier; Field Effect Transistors.
2. DIGITAL ELECTRONICS Number System, Logic Gates and Families, Logic Simplification, Arithmetic circuits, Decoders, Multiplexeres and De Multiplexeres, Sequential Circuits, Counters, Shift Register, A/D and D/A Converters,
3. LINEAR AND DIGITAL INTEGRATED CIRCUITS Basics of Operational Amplifiers, Op-amp with Negative Feedback, General Linear Application, Active Filters, Comparators, Timer and Multi vibrator.
4. ELECTRONIC INSTRUMENTS AND MEASURMENTS Voltage, Current and Resistance Measurement, Cathode Ray Oscilloscope, Impedance Bridges and Q Meters, Digital Instruments.
5. TRANSDUCERS AND SIGNAL CONDITIONING Variable Resistance Transducers, Variable Inductance transducer, Variable capacitance Transducers, Piezoelectric Transducers, Hall effect sensor, Optical transducers, Techo-generator, Thermocouples, Principle of Analog Signal Conditioning.
6. PROCESS INSTRUMENTATION & PROCESS CONTROL Measurement of Pressure , Torque, Power, Speed and Force, Measurement of Stress and Strain, Measurement of Motion, Thickness Measurement, Measurement of Density, pH, Humidity and Viscosity; Basic Control Loops and Characteristics, Controller Modes and Characteristics, Electrical Control Elements, Pneumatic and Hydraulic Control Elements, Control Valves, Switches.

ELECTRICAL ENGINEERING -SECTION B

1. BASIC NETWORK ANALYSIS Circuits Analysis, KCL, KVL, Batteries, Magnetism and Electromagnetism, Electromagnetic Induction, AC Fundamentals, AC Circuits, Poly-Phase systems. DC generators, DC motors, Transformers, Alternators, Synchronous Motors, Induction Motors.
2. MECHANICS—Units & dimensions, Newton's Laws of motion ,Circular motion, Centripetal & Centrifugal force, Conservation of momentum, Newton's law of gravitation. Moment of Inertia and radius of gyration, Moment of Inertia of Rod, Cylinder & Sphere.
3.ELASTICITY & FLUID MECHANICS—Hooke's law, Elastic constant, Surface Tension, Bernoulli's Theorem and its applications, Viscosity..
4. WAVE MECHANICS—Simple Harmonic motion, Doppler Effect, , Elementary idea of ultrasonic.
5. THERMAL PHYSICS—Isothermal and adiabatic changes, First & Second law of thermodynamics, Thermal conductivity, Black Body radiation

Question paper will consist of two sections i.e. Electronics & Instrumentation (weightage 60%) and Electrical Engineering (weightage 40%). Each section will be of equal marks. In each section questions shall be of objective, short answer and long answer type. Candidates may attempt all the sections.