

राष्ट्रीय शर्करा संस्थान
कानपुर

**NATIONAL SUGAR INSTITUTE
KANPUR**



सत्यमेव जयते

विवरण पत्रिका
**PROSPECTUS
2012**

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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:—

- (i) to provide technical education and training in research 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.

2. ADVISORY BOARD

The activities of the Institute are guided by an Advisory Board setup by the Government of India. The Composition of the Board (Constituted on 21.08.09) 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/Dy. Secretary (Finance),
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. Chief Director,
Directorate of Sugar,
Ministry of Consumer Affairs, Food & Public Distribution,
Department of Food & Public Distribution,
Krishi Bhawan, New Delhi. Member
5. A representative of Indian Council of Agricultural
Research, New Delhi Member
6. Director, Indian Sugarcane Research Institute,
Lucknow.(U.P.) Member
7. Managing Director,
National Co-operative,
Development Corporation, Khelgaon Marg, New Delhi. Member
8. Director General,
Vasantdada Sugar Institute, Pune,
Maharashtra. Member
9. Prof. & Head of Chemical Engg. Deptt.
IIT, Kanpur. Member
10. Shri A. Parida,
Director, Sugar Technology Unit,
Technology Information Forecasting & Assessment
Council, Ministry of Science & Technology New Delhi. Member
11. President, Indian Sugar Mills Association,
Ansal Plaza, New Delhi. Member

- | | | |
|-----|--|------------------|
| 12. | President,
National Federation of cooperative Sugar Mills Ltd.,
Ansal Plaza, New Delhi. | Member |
| 13. | President,
All India Distilleries Association,
Mumbai. (Maharashtra) | Member |
| 14. | Dr. G.S.C. Rao, Executive Director,
Simbhaoli Sugars Ltd.,
Simbhaoli, Uttar Pradesh | Member |
| 15. | Ms. Rajshree Pathy,
President, SISMA, Karumuttu Centre,
634, Anna Salai, Nandanam, Chennai-600035 | Member |
| 16. | Shri Vikramsinh Ghatge, Chairman,
Chhatrapati Shaju Co-operative Sugar Factory Ltd.,
Ghatge Bhawan, Kagal Distt. Kolhapur-416216 | Member |
| 17. | 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 05-09-2011) is as under:-

Prof. D. Mukherjee M.E.(Analysis & Design of Proc. Equip.)	Director
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A. Sugar Technology

- | | |
|---|----------------------------------|
| 1. Dr. Ashutosh Bajpai,
M.Sc., Ph.D., A.N.S.I. | Asstt. 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 K.Jagdish,
B.Sc.,
Dip. In Licentiatehip in Sugar Technology,
P.G.D.B.A., A.N.S.I., | Asstt. Prof. of Sugar Technology |
| 5. Shri Narendra Mohan,
B.Sc., A.N.S.I., F.N.S.I. | Asstt. Prof. of Sugar Technology |
| 6. Shri S.K. Trivedi
B.Sc., A.N.S.I., F.N.S.I. | Junior Technical Officer |
| 7. Shri A.K. Garg
B.Sc., A.N.S.I., | Junior Technical Officer |

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|--|----------------------------|
| 8. Shri Mool Chandra
B.Sc., A.N.S.I., | Senior Technical Assistant |
| 9. Shri Ajay Awasthi
B.Sc., A.N.S.I., | Senior Technical Assistant |
| 10. Shri A.K. Asthana
M.Sc., A.N.S.I., | Senior Technical Assistant |
| 11. Shri Mihir Mandal
M.Sc., A.N.S.I., | Senior Technical Assistant |
| 12. Shri Narendra Dev
B.Sc., A.N.S.I., | Senior Technical Assistant |
| 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 Ashish Kumar Shukla
B.Sc., A.N.S.I., | Technical Assistant |

B. Sugar Engineering

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| 1. Shri D.Mukherjee
M.E.(Analysis & Design of Proc.Equip.) | Prof. of Sugar Engineering |
| 2. Shri Doctor Swain
A.M.I.E. (Mech. Engg.),
A.N.S.I.(Sugar Engg.) M.Tech.(Mechanical Engg.) | Asstt. Prof. of Sugar Engineering |
| 3. Shri S.K. Chaudhary
B.E. (Electrical) | Asstt. Engineer (Elect.) |
| 4. Shri G.P.Gupta
Dip. in Mech. Engg. | Senior Research Assistant |
| 5. Shri Sevak Ram
Dip. in Mech. Engg. | Research Assistant (Engg.) |
| 6. Shri P. Prashant
A.M.I.E(Mech.Engg.)
A.N.S.I (S.E.) | Draftsman |

C. Instrumentation

- | | |
|---|-------------------|
| 1. Shri M.K. Banerjee
A.M.I.E. (Electronics & Communication Engg.) | Technical Officer |
| 2. Shri A. Savita | Fine Mechanic |

D. Design & Development

- | | |
|---|------------------------------------|
| 1. Shri J.P. Srivastava
M.Tech. (Mech. Engg.),
A.N.S.I. (Sugar Engg.) | Senior Scientific Officer (Design) |
| 2. Shri Narendra Kumar
Diploma in Mech. Engg. | Draughtsman Grade-I |
| 3. Shri Akhilesh Kumar Pandey | Draughtsman Grade-I |

E. Chemical Engineering

1. Vacant

F. Organic Chemistry

- | | |
|---|--------------------|
| 1.. Dr. (Mrs.) Chitra Yadav
M.Sc., Ph.D. | Research Assistant |
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G. Physical Chemistry

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| 1. Dr. P.K.Jain
M.Sc., Ph.D. | Physical Chemist |
| 2. Dr. Sudhanshu Mohan
M.Sc., Ph.D. | Research Assistant |

H. Agriculture Chemistry

- | | |
|------------------------------------|--------------------------------|
| 1. Shri Ram Krishna
M.Sc. (Ag.) | Research Assistant (Sel.Grade) |
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I. Biochemistry

- | | |
|--------------------------------------|---------------------------|
| 1. Dr. Santosh Kumar
M.Sc., Ph.D. | Junior Scientific Officer |
| 2. Shri Dinesh Chandra
M.Sc. | Research Assistant |
| 3. Mrs. Alka Gupta
M.Sc. | Laboratory Assistant |

J. Statistics

- | | |
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| 1. Shri Manoj Kumar I.S.S.
M.Sc. (Statistics) | Senior Statistical Officer |
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5. DETAIL OF COURSES

5.1 POST GRADUATE DIPLOMA & CERTIFICATE COURSES

The Institute provides facilities for training the students in Sugar Technology, Sugar Engineering, Industrial Fermentation and Alcohol Technology, etc. **AGE LIMIT FOR ALL COURSES: - 35 years (Maximum) as on 01.07.2012 Candidates born on or after 01.07.1977 only will be considered**

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

Course	Duration	Minimum Qualification		No. of Seats						Scope
		Academic (All educational qualifications should be from recognized Institute/School/College/Polytechnic/University).	Experience	General	Scheduled Castes	Scheduled Tribes	Rural	Defence	Total	
ANSI (ST) Post Graduate Diploma Course of Associate ship of National Sugar Institute in Sugar Technology	Two and half academic years (Academic year is from 1st July to 31st May.)	B.Sc. with Chemistry, Physics and Mathematics Or Bachelors Degree in Chemical Engineering.	---	35	09	03	11	02	60	Diploma holders of this course are appointed to the posts of Manufacturing Chemist, Lab Incharge, Chief Chemist, Technologists etc. in Sugar Industry & other deptt. dealing with sugar including N.S.I.
ANSI (SE) Post Graduate Diploma Course of Associate- ship of National Sugar Institute in Sugar Engineering	One and half academic years (Academic year is from 1st July to 31st May.)	Engineering Degree in MECHANICAL/ PRODUCTION/ ELECTRICAL/INSTRUMENTATION / ELECTRONICS or A.M.I.E.(From Institutions of Engineers,India)	----	14	04	01	05	01	25	Diploma holders of this course are appointed to the posts of Astd.Engr.Chief Engr., Production Engineer etc in Sugar Industry & other Depts. dealing with sugar and sugar machiner

DIFAT Post Graduate Diploma Course in Industrial Fermentation and Alcohol Technology	One academic year followed by 4 months practical training in a distillery or brewery.	B.Sc. with Chemistry / Applied chem./ Industrial Chem. or BIO- TECHNOLOGY OR BIO- CHEMISTRY as one of the subject. Or B.Tech. in BIO- TECHNOLOGY.	One year experience in a distillery or brewery or in a fermentation Industry on any Technical Post alongwith nomination.	14	04	01	05	01	25	Diploma holders of this course are appoint-ed to the posts of Supervisory Chemist, Chief Chemist, Works Manager, Distillery Manager etc. in distilleries, breweries & other fermentation Industries.
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5.2 CERTIFICATE COURSES.

SECC Certificate Course in Sugar Engineering	Two Off-seasons (July- November).	Diploma in engineering in MECHANICAL / ELECTRICAL / ELECTRONICS / INSTUMENTATION from a recognized Technical School / Polytechnic.	Nomination from a vacuum pan sugar factory is required.	8	2	1	3	1	15	This course is for those undergraduate engineers who have experience of work in sugar factories to enable them to hold higher positions.
SBCC Certificate course in Sugar Boiling	One off- season (July- 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 pan-operation in a vacuum pan sugar factory alongwith Nomination.	29	8	3	8	2	50	The certificate holders are eligible for the posts of Panman, Head Panman, Laboratory Chemist, etc., in sugar factories.
PHCMS Certificate Course in Pre-harvest Cane Maturity Survey	One and half months (15th October to 30th November).	Intermediate with Science/ Agriculture or equvelant.	One year experience in a sugar factory laboratory or field work .	9	1	1	1	1	13	The certificate holders can be appointed to the posts of Supervisor, Inspector etc., in cane departments of sugar factories.

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

(a) Qualifications for admissions

<u>Diploma</u>	<u>Admission Qualifications</u>
(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.

Un-sponsored 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. :-

- (i) 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.
- (ii) 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.
- (iii) 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.
- (iv) 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.
- (v) Each candidate will have to submit three typed copies of his/her thesis embodying the result of his/her investigation not later than November 15 or May 15, 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.

- (vi) 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.
- (vii) 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. TUTION AND OTHER FEES

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

Course	Per month (Rs.) for	
	General Candidate	S.C /S.T Candidate
1	2	3
(i) Fellowship of the Institute	50.00	30.00
(ii) Associateship of the Institute in Sugar Technology or Sugar Engineering	50.00	30.00
(iii) Industrial Fermentation and Alcohol Technology	50.00	30.00
(iv) Sugar Engineering Certificate Course	50.00	30.00
(v) Sugar Boiling Certificate Course	50.00	30.00
(vi) Pre-harvest Cane Maturity Survey Certificate Course	50.00	30.00

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:-

Item	Fee/ Deposit Amount(Rs.)
1	2
(i) Caution Money deposit:	
a. For diploma Courses	500.00
b. For Certificate Courses	200.00
(ii) Annual subscription for Scientific Society	100.00
(iii) Annual games fees	250.00
(iv) Annual subscription for Cultural Society	150.00
(v) Examination:	
a. For diploma Courses	150.00
b. For Certificate Courses	50.00
(vi) Common Room fees per year	100.00
(vii) Alumni fees	100.00
(viii) Medical fees per term of six month	15.00
(ix) Hostel fees:	
a. Hostel Admission fees	50.00
b. Room rent per month	100.00
c. Electricity and water charges per month	60.00
d. Hostel caution money	100.00
e. Hostel crockery fee per term	10.00
f. Hostel mess advance per month	1800.00
g. Hostel Establishment	500.00
(x) Convocation fees	500.00
(xi) Educational tour	200.00
(xii) Identity Cards Fees	20.00

Educational tour fees is required to be paid by the students of A.N.S.I.(Sugar tech.),A.N.S.I.(Suga.Engg.) and D.I.F.A.T only.

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 (i)] and hostel caution money [Item 6.2 (ix) (d)] are refundable.
3. The total amount payable by the students of the different courses would be as follows:-

6.3 TUITION AND OTHER FEES

Courses	Period	Total amount Payable (Rs.)
1	2	3
Fellowship Diploma of the Institute (F.N.S.I.)	First term	14495.00
	Second term	13175.00
	Third term	13175.00
Associateship of National Sugar Institute (Sugar Technology)	First Year	25120.00
	Second Year	14450.00
	Third Year	9575.00
Associateship of National Sugar Institute (Sugar Engineering)	First Year	14300.00
	Second Year	11375.00
Diploma Industrial Fermentation and alcohol Technology	Full Period	26975.00
Sugar Engineering Certificate	First Year	12415.00
	Second Year	11375.00
Sugar Boiling Certificate	Full Period	12355.00
Pre-harvest Cane Maturity Survey Certificate.	Full Period	6165.00

NOTE:- ABOVE COURSE FEES ARE SUBJECT TO REVISION

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.	Donor	No. of Scholar-Ships or Awards	Value	Basis of award	
				Position	Examinations
1	2	3	4	5	6
1.	Government of India, Ministry of Consumer Affairs, Food & Public Distribution.	1	Rs. 150 per month	Ist in the order of merit	First year
2.	Government of India, Ministry of Consumer Affairs, Food & Public Distribution.	1	Rs. 100 per month	2 nd in the order of merit	First year
3.	Indian Sugar Mills Association New Delhi.	1	Rs. 3000 in lump sum	Ist in the order of merit	First year
4.	National Federation of Co-operative Sugar Factories (N.F.C.S.F.)	1	Rs. 3000 in lumpsum	Ist in the order of merit.	Final Year
5.	National Sugar Institute	1	Mahatma Gandhi Memorial Gold Medal.	Ist in the order of merit.	Final Year
6.	Late (Shri) S.N.Gundu Rao Memorial Scholarship	1	Rs. 150 per month.	Ist in the order of merit.	First Year
7.	Late (Dr.) S.Mukherjee Memorial Gold Medal	1	Gold medal	Highest marks in Organic Chemistry.	First Year
8.	Late (Dr.) Kripa Shankar Memorial Scholarship	1	Rs. 300 per month.	Highest marks in Sugar Tech.	First Year

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

Sl.	Donor	No. of Scholar-Ships	Value	Basis of award
1.	Government of India, Ministry of Consumer Affairs, Food & Public Distribution.	4	Rs. 300 each per month	In the order of merit of from the selection test.

7.3 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) In the case of Associateship Courses, if the number of students eligible for a particular category of scholarship exceeds the available number of scholarships of that category, the award is decided on the basis of merit in the 1st year examination. Those who are already in employment will not be entitled for any scholarship.

8. INSTRUCTIONS TO CANDIDATES

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 anyone.***
- (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 / counselling for admission.
- (6) Admission of foreign students is processed through proper diplomatic channel. Eligibility criterion of age and qualification etc., as specified in the prospectus for various courses apply to foreign students also with the provision that these may be relaxed by the Govt. of India.
- (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.**

8.2 For Candidates of A.N.S.I. (Sugar Technology),A.N.S.I. (Sugar Engineering),D.I.F.A.T & S.B.C.C 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)/ Courses can also apply for admission.
2. However they are required to provide the 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 counselling failing which they will not be admitted and no relaxation is possible to be given on this account. But they are required to submit, attested copies of rest of the mark sheets (each year/semester of B.Sc./B.E.) 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.B.C.C courses will be held **in June 2012 as per programme given below.**

A.N.S.I (SUGAR TECH.) COURSE

DATE	TIME	SUBJECT
17.06.2012	09:00 AM. to 11:00 AM.	PHYSICS
17.06.2012	12:00 NOON to 02:00 PM.	CHEMISTRY
17.06.2012	03:00 PM. to 05:00 PM.	MATHEMATICS

S.B.C.C COURSE

DATE	TIME	SUBJECT
17.06.2012	09:00 AM. to 11:00 AM.	As per syllabus given in Prospectus

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

DATE	TIME	SUBJECT
17.06.2012	12:00 noon. to 02:00 PM.	ENGINEERING

D.I.F.A.T COURSE

DATE	TIME	SUBJECT
17.06.2012	03:00 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. The syllabus for the entrance examination of A.N.S.I. (Sugar Tech.) is given on page no 19 for A.N.S.I. (Sugar Engg.) is given on page no 23, for D.I.F.A.T Course is given on page no. 27 .& for S.B.C.C course is given on page no.29
5. For counselling, provisionally selected and wait listed candidates will be informed by post at their correspondence address.

6. Candidates already employed in the sugar industry /diethylary 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 D.I.F.A.T & S.B.C.C 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 Centre.

8.3 For candidates of S.E.C.C. & Pre Harvest Cane Maturity Survey Certificate Course (P.H.C.M.S.)

1. Admission for S.E.C.C. and P.H.C.M.S. course will be based on personal interview only.
2. The candidates who have appeared in the final examination of minimum prescribed qualification for S.E.C.C. and P.H.C.M.S Courses can also apply for the admission.
3. However they are required to provide the 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 counselling failing which they will not be admitted and no relaxation is possible to be given on this account. But they are required to submit, attested copies of rest of the mark sheets along with application form.
4. Application forms for above courses should be accompanied by the nomination form duly completed and signed by competent authority under his seal, as mentioned in the prescribed form.
5. 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.
6. For counselling, provisionally selected and wait listed candidates will be informed by post at their correspondence address. The candidates are required to take the admission immediately after the counselling.
7. After admission, the candidates will not be allowed any leave to go back to their homes.

10. Guidelines for filling the Application Form :-

- (a) 1st step: - Eligibility Checking Online (Studentship Number Generated)
2nd step: - Application form Fill-up.(After Downloading Application Form from the Website)
- (b) The application form duly filled should be submitted along with the following documents.
 - (i) Pass port size Photo should be duly attested by a Gazetted officer / Principal of the last college attended /M.L.A./M.P. (with seal) at place given in the application form.

- (ii) Attested copy of the certificate as proof for date of birth
- (iii) Attested copies of the mark sheets. [For each Year / Semester of B.Sc./B.E.]
- (iv) Original copy of the nomination form placed at Appendix II should be submitted. [**Compulsory for DIFAT, SBCC,SECC & PHCMS**]
- (v) Three similar **unattested** passport size photographs affixed on the admit card.
- (vi) For S.C./S.T. category candidates, certificate from appropriate authority in the rank of D.M./Collector/S.D.M./Tehsildar, with legible seal should be submitted.
- (vii) For candidates belonging to rural category the certificate must be given in prescribed form placed at Appendix-I
- (viii) For candidates belonging to defence category, the certificate should be on the letter head duly signed by the Unit Head or Soilder board with seal.
- (ix) Experience certificates should be submitted on the official letter head of factory only. [**Compulsory for DIFAT, SBCC & PHCMS**]

(For details visit our Website- <http://nsi.gov.in>)

SYLLABUS FOR ENTRANCE EXAMINATION
A.N.S.I. (SUGAR TECHNOLOGY) COURSE
MATHEMATICS

1. **ALGEBRA**-Development of number system, Natural numbers, Integers, Rational numbers, Real & complex numbers, Division algorithm, greatest common divisor, polynomials, derivation of integral, rational, real & complex roots of Polynomials, relation between roots and coefficients, repeated roots, elementary symmetric functions, numerical methods of solution of algebraic equations.
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.
Common catenary 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.

CHEMISTRY

GENERAL & PHYSICAL CHEMISTRY

- (1) Atomic structure, Modification by Sommerfield, Quantum numbers, Aufbau Principle, Pauli's exclusion principle, Hund's rule.
- (2) Electronic theory of valency, variable valency, sigma & pi bonds, sp^3 sp^2 & sp hybridisations.
- (3) Radioactivity (Natural & Induced), Half life period, Group displacement law, Radioactive series, Nuclear energy, Nuclear fission & fusion, artificial radioactivity, nuclear reactions.
- (4) Isotopes, including radio isotopes, separation and their uses, isobars.
- (5) Kinetic theory of gases. A qualitative treatment of Maxwell-Boltzmann Distribution Law, Ideal gases, Vander Waal's equation.
- (6) Solutions- Henry's Law & its verification; solubility effect of temperature on solubility; completely & partially miscible liquids; Fractional & Steam distillation, Azeotropic mixture.
- (7) Theory of dilute solutions- Osmotic pressure & its determination, Lowering of vapour pressure & Freezing point & Elevation of boiling points of a solvent by a solute; Theory of semi-permeability; isotonic solution; Plasmolysis; Determination of molecular weights of dissolved substance; Abnormal molecular weights, Vant Hoff's factor.
- (8) Chemical equilibrium- Homogeneous & heterogeneous system, equilibrium constant, effect of temperature on equilibrium constant; Law of mass action ; definition & verification & its application to simple homogeneous & heterogeneous systems. Le Chateleur & Braun's Principle, its application.
- 9 Colloids – General method of preparation, properties & uses of colloids; Lyophilic & Lyophobic soln, charge of colloidal particle; Stability, protection & coagulation of colloids; Gold no, its application, Tyndall effect, Brownian Movement.
- 10 Thermochemistry- Laws of thermochemistry, Internal Energy; Enthalpy; Heat of reaction at constant volume & constant pressure. Heats of formation, combustion, solution, transition & neutralization & their determination. Effect of temperature on heat of reaction, Kirchoff's equation. Hess Law of constant heat summation.
- 11 Thermodynamics- First & second law of thermodynamics; Entropy; Joule-Thomson effect, coefficient, Carnot cycle & thermodynamic efficiency; Helmholtz's & Gibbs free energy.
- 12 Electrochemistry- specific, equivalent & molar conductivities. Ionic conductance, ionic mobility, Kohlrausch Law. Transport No. & its determination. Solubility of sparingly soluble salts. Electrode potential & Nernst equation, Reference electrodes, Description & working of hydrogen & glass electrodes & their use in pH determination. Common ion effect, solubility product & its application.
- 13 The phase rule, phase diagrams of one & two component system (water , sulphur & Ag-Pb) with application to phase rule.
- 14 Distribution law & its application.
- 15 Chemical Kinetics- Molecularity & order of a reaction, Derivation of rate constant of first & second order reaction.

16 Crystallography- Crystal size & shape, elements of symmetry-space lattice, crystal systems, Miller's indices, Types of crystals.

ORGANIC CHEMISTRY

- (1) Character of chemical bonding in organic compounds, bond energy, bond polarity. Rotation around bond, orientation, Mechanism of Addition, Substitution, Elimination Reactions.
- (2) Optical & geometrical isomerism, asymmetric carbon atom, racemisation & resolution of racemic mixtures, resonance & its application in organic chemistry.
- (3) Methods of preparation, properties & uses of alkanes, alkenes and alkynes, dienes, alcohols, aldehydes, ketones, esters, ethers, amines, amides, amino acids and proteins.
- (4) Carbohydrates- classification, structure of D-glucose & fructose (open & ring structure), interconversion 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.
- (5) Benzene & its structure. Simple reactions of benzene, toluene, phenols, nitro & amino compounds, benzoic, salicylic, cinnamic, sulphonic acid, aromatic aldehydes & ketones, diazo, azo compounds, naphthalene, pyridine, Thiophene and Furan.

INORGANIC CHEMISTRY

- (1) Periodic properties- Ionization potential, Electron Affinity, Electro negativity, Polarization.
- (2) Oxidation states & oxidation number, common oxidizing & reducing agents, ionic equations and balancing of chemical reactions by oxidation- reduction method.
- (3) Chemistry of common elements & their compounds especially from the point of view of periodic classification with reference to Transition element.
- (4) Coordination compounds-double & 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 complexions.
- (5) Principles of inorganic chemical analysis.
- (6) Manufacture of: sodium carbonate, sodium hydroxide, ammonia, nitric acid, sulphuric acid & oleum.
- (7) Metallurgy & Chemistry of less common metals e.g. Li, Ag, Cu.
- (8) Modern concept of Acids & A bases.

PHYSICS

MECHANICS—Units & dimensions, Newton's Laws of motion, Circular motion, Centripetal & Centrifugal force, Conservation of momentum, Principle of Rocket, Newton's law of gravitation. Moment of Inertia and radius of gyration Moment of Inertia of Rod, Cylinder & Sphere.

ELASTICITY—Hooke's law, Elastic constants Bending of beam, Cantilever Torsion of Cylinder, Surface Tension, Bernoulli's Theorem and its applications, Viscosity, Poiseuille's formula.

WAVE MECHANICS—Simple Harmonic motion, Simple Harmonic Oscillator, Vibration of spring & spring constant, Law of super position of waves, Beats, Stationary waves, Damped oscillation and Resonance, Vibration of string and air column, Doppler Effect, Acoustic of Halls, Sabine's Law, Elementary idea of ultrasonic.

THERMAL PHYSICS—Isothermal and adiabatic changes, First & Second law of thermodynamics, Carnot's cycle & efficiency, Proof of Carnot's theorem, Perfect gas scales, Entropy, Clausius Clapeyron equation, Joule-Thomson Effect and its application in liquefaction of gases, Thermal conductivity, Black Body radiation.

OPTICS— Interference of light, Coherent sources, Fresnel's biprism. Newton's rings. Displacement of fringes. Michelson's interferometer. Zone plate. Diffraction grating, Determination of wavelengths, Resolving power and Rayleigh criterion, Double refraction in a uniaxial crystal. Quarter and half wave plate; Circularly & Elliptically polarized light, Specific Rotation of plane of polarization, Polarimeters & its application in Sugar Industry, Chromatic aberration.

ELECTRICITY & MAGNETISM—Coulomb's Law, Electric potential, Capacity, Parallel plate capacitor, Gauss theorem and its application, Lorentz force, Idea of para, Di and Ferro magnetism, Hysteresis curve, Electric Current, Kirchhoff's Law, Galvano meter, Faraday's Law of electromagnetic induction, Self and mutual Inductance, Alternating current, LCR circuit.

ATOMIC & NUCLEAR PHYSICS- Structure of atom, Bohr's theory of Hydrogen spectrum, Measurement of 'e' and 'e/m' of an electron, X-Rays and Mosley's Law, Bragg's Law, Characterize of X-Ray, Spectrometer, Compton Effect, Radio-activity, Half life, Structure of nucleus, Fission and Fusion, Chain Reaction, DeBroglie wave.

ELECTRONICS- Semi conductor, Doping, 'p' and 'n' type semi conductor, p-n Junction and Zener Diode, Rectifier, Transistor, Cathode Ray Oscillograph, Elementary idea of Laser.

SYLLABUS FOR ENTRANCE EXAMINATION
A.N.S.I. (SUGAR ENGG.) COURSE
MECHANICAL ENGINEERING

1. **Properties of Steam** Generation of steam, Steam tables. Enthalpy and entropy of wet and superheated steam, Temperature-Entropy (TS) and Pressure –Volume (PV) diagrams for steam processes. Constant pressure, constant volume, adiabatic, isothermal, polytropic and thermal processes. Dryness fraction, Mollier Diagrams, etc.
2. **Concept and Laws of Thermodynamics** Definitions, continuum microscopic and macroscopic properties density, pressure & temperature. Zeroth Law, first law and second law of thermodynamics. Properties of steam, intensive and extensive properties. Cyclic, non-cyclic, quasi-static, reversible, irreversible, flow, non-flow, steady flow, throttling processes, Carnot cycle, efficiency of Carnot cycle.
3. **Steam Generators** Types of boilers, functioning. Boiler mountings and accessories. Performance of Boilers. Evaporation rate and Boiler efficiency. Draught in Boiler, classification, measurement of draught. Power required for draught fan. Calculation of chimney height, diameter and efficiency.
4. **Fuels and Combustion** Types of fuels, calorific value of fuels, combustion equations. Flue gas analysis, Orsat analysis. Air fuel ratio. Theoretical and excess air required for combustion.
5. **Steam Engines** Classification and functioning, indicator diagram IHP, BHP. Mechanical, thermal and indicated efficiencies. Specific steam consumption, Saturation curve.
6. **Condensers** Classification, functions, vacuum measurement. Mass of circulating water required. Air removal. Vacuum efficiency.
7. **Steam Turbines** Principle, classification, impulse and reaction turbine. Velocity diagrams. Performance, efficiencies. Reheat factor. Governing. Back pressure and Pass out turbines.
8. **Heat Transfer** Conduction, thermal conductivity, conduction through flat wall, hollow cylinder, composite cylinder, spheres etc. Convection, free and forced convection, log mean temperature difference. Heat exchanger. Radiation, absorption, reflection & transmission of radiation, concept of black body, Plank's Law, Stefan-Boltzman's Law, heat transfer coefficient for radiation.
9. **Air Compressor** Classification, functioning, clearance & clearance volume. Equation for shaft work. Efficiencies, isothermal efficiency, adiabatic efficiency, volumetric efficiency. Multistage compressor. Heat rejected per Kg. of air, mean effective pressure, IHP from indicator diagrams, mechanical efficiency.
10. **Mechanics** Inertia, Mass, weight, force, couple, displacement, velocity, acceleration. Equilibrium of forces and couples. Angular, velocity, angular acceleration. Mass moment of Inertia. Work, power and energy, conservation of energy and momentum. Impulse, Collision of elastic bodies, Centripetal force. Simple harmonic motion, simple and compound pendulum, equivalent dynamic system. Newton's laws of motion, D'Alembert's principle. Acceleration of a geared system. Gyroscopic gyroscopic couple, gyroscopic stabilization, displacement-time and acceleration-time curves. Mechanisms with lower pairs.

11. **Friction** Definition, friction between dry surfaces, limiting friction, normal friction, coefficient of friction, angle of friction, angle of repose, laws of Coulomb friction. Screw friction, pivot and collar friction. Rolling friction, ball and roller bearings. Plate and disc clutches. Lubrication, fluid film lubrication, thrust bearings, journal bearing.
12. **Belt, Rope and Chain Drives** Belt friction, ratio of tensions, centrifugal stress in the belt or rope, power transmitted by belt and rope, idlers, belt and rope materials, flat and v-belt, belt selection. Chain drives, types of chain.
13. **Cams** Types of cams, types of followers, displacement, velocity and acceleration time curves. cam profile., cams with specified contours.
14. **Toothed Gearings** Types of gears, definition and terminology of gears, law of gearing. Interference, methods of reducing interference, minimum number of teeth required to avoid interference, arc of contact. Spur gear, helical gears, bevel and worm gears. Design of spur gear, efficiency of spur gears. Methods of manufacturing of gears, Gear trains, compound gear train, epicyclic gear trains.
15. **Flywheel** Function turning movement diagram for single and multi-cylinder steam engines, fluctuation of energy, maximum fluctuation of energy, coefficient of fluctuation of energy, energy stored in a flywheel, stresses in flywheel, dimension of the flywheel.
16. **Governers**—Types of governors, centrifugal spring-loaded governors, governor effort and power, controlling force, friction and insensitiveness, hunting.
17. **Balancing** Balancing of single revolving mass, placing of masses in the same plane and different plane, balancing of reciprocating mass, partial balancing, static and dynamic balancing, balancing machines.
18. **Vibration** Definitions, types of vibration, free and forced vibration. Natural frequency of free transverse vibration due to point load and uniformly distributed load (UDL), effect of inertia of the constraint on longitudinal and transverse vibrations, critical and whirling speeds. Damped vibrations, frequency of free damped vibrations, damping factor and damping ratio, logarithmic decrement, frequency of under damped forced vibration. Magnification factor and dynamic magnification. Vibration isolation and transmissibility. Torsional vibrations, natural frequency of free torsional vibration, effect of inertia of the constraint on torsional vibration, free torsional vibration of a single, two and multi-rotor system. Torsional equivalent shaft. Torsional vibration of a gear system.
19. **Structural Engineering**—Stress, Strain, Hook's law, Poisson's ratio, working stress, factor of safety, temperature stress, principal plane and stresses. Mohr's circle of stress. Thin cylinder under pressure. Bending moment, shear force in simply supported beams and cantilevers. Simple theory of bending of beams. Torsion of circular sections. Springs, closes coiled helical spring. Theory of long columns. Euler's and Rankine formulae. Strain energy in tension, compression, shear bending and torsion. Impact loads on tension members. Riveted and welded joints.

ELECTRICAL ENGINEERING

1. **Electrical Current and OHM's Law**—Idea of electrical potential, Resistance, Laws of resistance. Resistivity, conductance & conductivity, effect of temperature on resistance, OHM's Law, resistance in series and in parallel. Net work theorem, Kirchoff's Laws, Delta/Star and Star/Delta Transformations.

8. **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.
3. **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.
4. **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. A.C. through resistance and capacitance. Resonance in R.L.C. circuit, Graphic representation of resonance. Resonance curve. Q-factor of a series circuit, Parallel A.C. circuits, Vector and phasor method. Application of admittance method. Complex or phasor 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. Graphic representation of parallel resonance. 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,. Star/Delta/Star connection. Phase sequence indicators.
5. **D.C. Generators**—Principles, working and construction, Types of generators, generated emf and emf equation. Losses, efficiencies, Characteristics of D.C. Generators, No load curve. Critical resistance, critical speed, Voltage built up of shunt generators, Series generators. Compound generators, application of generators.
6. **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.
7. **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 transformers.
8. **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 slip, Measurement of slip, Power stages, Rotor output.
9. **Synchronous motors**—Principle of operation, Method of starting, motor on load and effect of increase in load, Torque developed by the motor, expressions of power developed. Various conditions for maxima. Effect of excitation on armature. Current and power factor, constant power lines. Construction, of V-curves. Phase swinging.
10. **Alternator**—Basic Principle. Construction, Armature Windings. Connections. Pitch Factor. Distribution Factor, Equation of induced emf. Effect of harmonics on pitch and distribution factors. Alternator on load. 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.

11. **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.

SYLLABUS FOR ENTRANCE EXAMINATION
POST GRADUATE DIPLOMA COURSE IN INDUSTRIAL
FERMENTATION AND ALCOHOL TECHNOLOGY

1. Acids, bases, pH and buffers.
2. Theory of solutions, molar and normal solutions.
3. Distillation of homogenous binary mixtures.
4. Optical activity, optical rotation, chirality.
5. Structure and properties of monosaccharides, disaccharides. oligosaccharides and polysaccharides, Mutarotation, Inversion of sucrose, colour test with sugars, Estimation of total reducing sugar by fehling solution.
6. Classification, structure and properties of amino acids and proteins, general idea about catalysis, enzymes, enzyme activity and importance of enzymes in fermentation industry.
7. Alcohols, their classification, differences between primary, secondary and tertiary alcohols.
8. Outline of alcohol production in distillery.
9. Molasses- Composition, grades and characteristics.
10. Yeast, Structure, Growth, Yeast counting.
11. Yeast propagation in Lab.
12. Yeast propagation in yeast vessels and prefermenter.
13. Attenuation and anarobic fermentation.
14. Significance of pH in fermentation.
15. Antifoams and their role in fermentation.
16. Beer heater, reboiler and Plaet Type Heat Exchanger (PHE).

17. Analyzer, rectifier, aldehyde and other columns, Difference between bubble caps and tunnel caps, fermentation and distillation efficiency, Reflux ratio & Multi pressure re-distillation (MPR) .
18. Rectified spirit, denatured spirit, and power alcohol.
19. Extra neutral alcohol, preparation and uses.
20. Reduction, Blending, Maturation and Ageing.
21. Country liquor and Indian made foreign liquors (IMFL).
22. Spent wash, its characteristics and treatment.
23. Biogas generation from spent wash, COD and BOD.
24. Biocomposting, Reverse osmosis and incineration of spent wash.
25. Analysis of rectified spirit and ENA for alcohol %, acidity, aldehydes and PP-time (Potassium Per Manganate Reduction Time).
26. Outline of grain spirit production.
27. Gelatinization, Liquefaction and Saccharification of grain flour, Jet cooker and enzymes used in grain spirit production, Distiller's Dried Grain Substance (DDGS) and its uses.
28. Outline of beer manufacture.
29. Malt and malting, mashing techniques, importance of wort boiling, fermentation of wort for beer manufacture, types of beer, Lagering of beer, Beer defects.
30. Difference between Beer, Wine, Whisky, Rum, Gin, Vodka etc.

SYLLABUS FOR ENTRANCE EXAMINATION **SUGAR BOILING CERTIFICATE COURSE**

Pan boiling process:

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 Boiling House.
3. An overview of the Working, Types and Design of Equipments used for sugar manufacture: (from Milling to Sugar Bagging).
4. Basic of Steam generation, Vapour bleeding etc,
5. Details of equipments installed at pan station.
6. Basics of the Process of vacuum pan boiling, Types and Grades of Sugar Produced, Boiling Schemes, Masecutes, Molasses their purities, Brixes, Grain Sizes etc.
7. Preparation of A masecuite, B masecuite & C masecuite.
8. Saturation, Super saturation, coefficient of Super-saturation & its application in sugar boiling.
9. Different methods of graining, Methods of slurry preparation, False grain & conglomerates.
10. Different instruments Used in Vacuum Pan control and their Designs,
11. Different types of Vacuum Pans used in the sugar industry, their parts, connections, etc.
12. Comparison between batch pan & Continuous pan.
13. Details of Vacuum Generation, Temperatures and Vacuums in Pans and Evaporators, usage of Condensate etc.
14. General Idea about the Working and designs of Crystallisers, Centrifugals, Grader etc.

Mathematics and Science:

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, cuboid, 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.