

Sugar Milling Research Institute NPC

SMRI TRAINING COURSES



Sugar Milling Research Institute NPC
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Sugar Milling Research Institute NPC

SMRI Advanced Programme in Sugarcane Processing (APISP)

Objective: This course is designed to equip individuals with essential knowledge of Sugar Engineering in support of their roles within the sugar factory.

Who should attend this course?

The APISP postgraduate program is specifically designed for technical graduates and diploma holders. It aims to transform your engineers and scientists into sugar engineers. This course is the modern evolution of SMRI's highly regarded Ten-Week Course in Sugar Engineering, updated and enhanced for today's industry needs.

The APISP course is typically integrated into company engineer-in-training schemes, and graduates of this program are expected to become future leaders in the sugar industry.

Online and onsite learning

For students who wish to complete the advanced course in the classroom over 3 months at the SMRI, that option is also available. While the training material remains the same, students work under supervision here at SMRI.

The APISP course runs annually and is offered online over 11 Months or onsite at the SMRI over 3 months.

The online students kick off in April each year and conclude in February of the following year, and follow our structured schedule of online tutorials, written assignments, and tests with set deadlines. Commitment is essential, and students completing the online APISP should anticipate spending 6 to 8 hours per week to finish in 9 months.

On-site students start in September and complete the course at the end of November.

To ensure you're always in the loop, training departments receive regular, detailed updates on their students' progress as they navigate through the various course modules. Problems as they arise are addressed proactively to ensure all students complete the course within the allotted time.

A highlight of the advanced course is the **10-day practical session held in November each year at the SMRI**. Students get hands-on experience recovering sugar directly from sugarcane, working through each of the stages of sugar manufacture on a pilot plant scale. This is a chance to put the theory into practice.



Course content

1. Introduction
2. Factory Performance Calculations (FPC)
3. Mass & Energy Balance (MEB)
4. Basic concepts and chemistry
5. Sugarcane agriculture
6. Cane handling, preparation, extraction: milling and diffusion, conveyors
7. Steam, energy, boilers & boiler-water treatment
8. Laboratory practice
9. Clarification
10. Steam & Evaporation
11. Sugar crystal recovery (boiling house operations)
12. Engineering & maintenance
13. Sugar refining & sugar drying
14. Process control, process modelling, bad data & data handling
15. Water treatment & effluent
16. Ethanol & ethanol production
17. Assignment: Literature review project
18. Value-added lectures – Emerging Technologies.
- 19 Cane-to-Crystal practical



For enquiries and further information, please contact:

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Look at the Learning site here-

<https://thinkfic.smri.org/>



Sugar Milling Research Institute NPC

From Stick to Crystal: A Brief Introduction to Sugar Technology (Online)

Objective: This course is designed to equip individuals with essential knowledge in support of their roles within the sugar industry, regardless of their technical background.

Who should attend this course?

The "From Stick to Crystal" course is suitable for everyone in the sugar industry, no matter their technical background.

If you are new to the world of sugar, this course is the ideal starting point for both technical and non-technical staff seeking a clear introduction to sugar production.

This course is extremely valuable for anyone involved in the sugar industry. This includes individuals in support roles such as administration, HR, agriculture, purchasing, marketing, finance, and accounting. Those who support the industry can also benefit greatly, such as company representatives, suppliers, and customers.

Online learning

Participants will gain essential insights into core processes relevant to their specific roles through engaging in online video lectures and multiple-choice tests. The course is designed to enhance learning and ensure participants understand the entire sugar production process. SMRI staff are available to answer questions throughout the course, fostering a supportive learning environment.

The lessons are delivered in a simple, easy to understand format, making sure that both newcomers and non-technical staff feel at ease.

The online format means that students can move ahead at their own pace so that studies can fit in with other commitments.



Course content

The course content is based on what was formerly known as the SMRI one-week introductory course in sugar technology

The course offers an effective overview of sugar production, covering everything from the field to the factory.

Upon completion, students will gain a practical understanding of the entire sugar manufacturing process and will be equipped to knowledgeably engage with sugar factory staff.

Curriculum

Part 1 - Sugar Industry Overview

Part 2 - Terminology and Basic Concepts

Part 3 - Harvesting and Cane Yard

Part 4 - Preparation and Extraction

Part 5 - Juice Preparation

Part 6 - Evaporation

Part 7 - Crystallisation

Part 8 - Centrifuging and Drying

Part 9 - Sugar Refining

When can I start?

SMRI Members have the option to enrol their teams in the "From Stick to Crystal" course at any time during the year.

Students progress at their own pace to suit their schedules.

While the course is typically completed within two weeks, participants have up to six months to finish the course.

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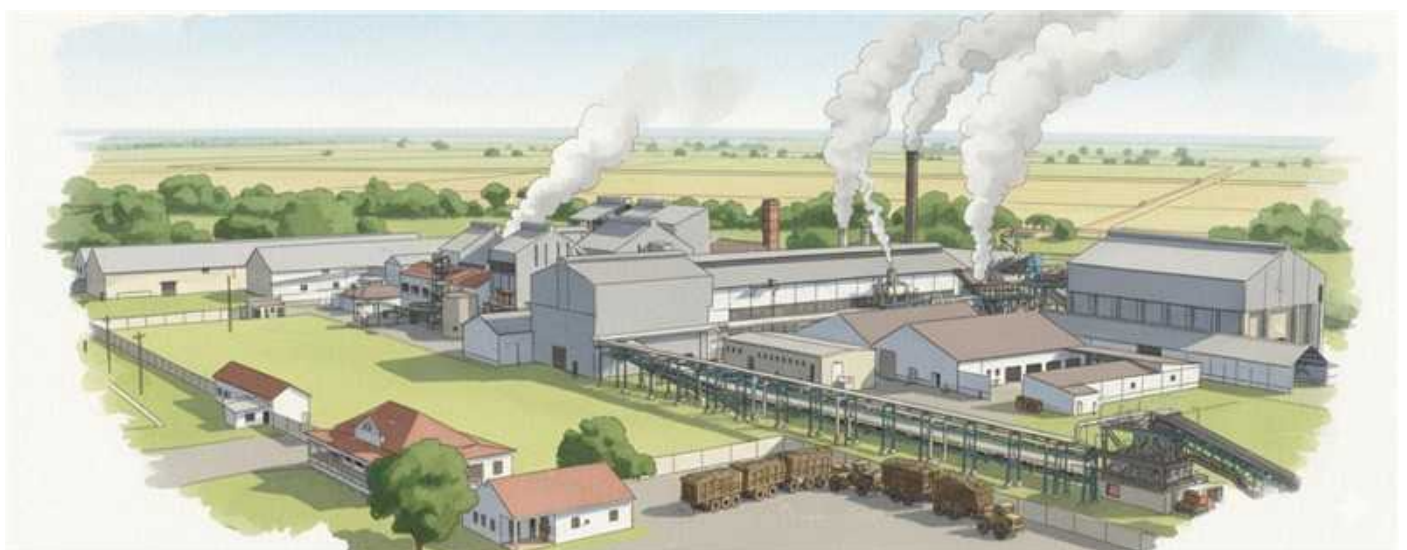
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Mastering factory performance parameters and cane crush planning

Objectives

- Understand the implications of factory performance figures through an understanding of the calculation processes involved.
- Develop a cane crush budget plan.

Who should attend this course?

Senior-level managers who are required to make management decisions around factory performance calculations and crush budgeting.

How will it help me?

On completion of the course, you will be able to:

- Use the performance figures presented in daily, monthly, and annual factory reports as a technical management tool.
- Query and troubleshoot factory performance calculations.
- Investigate poor process performance through a targeted approach based on the calculation processes.
- Using a spreadsheet to construct a complete cane crush budget plan for your factory



Course content

All modules are presented online. Online interactive tutorials will answer questions and consider case studies. The course includes:

- ✓ Mass balances and overall indicators of process performance, including OR, FPI, VR, XRE, time accounting and cane payment systems.
- ✓ Calculation of Extraction, CRE, Pol and Brix Factors
- ✓ Sugar recovery and losses: BHR, CRB; TPD, molasses factor, UDL and M&E calculations
- ✓ Refinery calculations
- ✓ Developing a crush budget spreadsheet.

Students have up to six months to complete the course online.

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Sugar Milling Research Institute NPC

SMRI Laboratory Analyst Refresher Training (ART)

Objective: The training is designed to teach best laboratory practice, to ensure accurate and reproducible results for optimum sugar factory control.

Who should attend this course?

This course is intended for laboratory analysts working in sugar mills and refineries. It offers a refresher and updates on all standard analytical methods used in these facilities.

When do we run the course?

This course is typically run during off crop. Booking well in advance is essential to ensure the specific needs of your factory are met.

On-site learning

This convenient course is conducted on-site at your factory over a period of 5 days. Two experienced SMRI trainers will spend the entire week at your facility, providing training for up to 15 staff members per course.

The training thoroughly covers essential analytical methods, which can be tailored to meet your factory's specific needs and equipment. It includes a detailed analysis of raw and refined sugar, as well as the analysis of final molasses.



Course content

The ART course includes a full day of lecture presentations covering critical topics such as Good Laboratory Practices, instrument verifications and calibrations, detailed analytical test methods, NIRS, and more.

This theoretical foundation is complemented by practical demonstrations and clear explanations of each analytical step provided by our trainers, who will work directly with your team in your laboratory.

Your lab analysts will then conduct tests on SMRI check samples, which will be thoroughly evaluated by the trainer.

This process culminates in a comprehensive discussion of the results, including any necessary remedial actions to ensure accuracy and consistency.

Typical Program

Day 1: A full day's lectures on every aspect of laboratory operation and best laboratory practices.

Day 2: Verification and calibration of laboratory instruments to maximise efficiency thereof.

Days 3, 4 & morning of day 5: Analytical technique assessment through sample analyses + demonstrations.

Day 5: A 1-hour written test/assessment based on the training.

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Factory Chemist Course

Objective

To provide theoretical and practical training for those involved in managing or supervising the laboratory services in a raw sugar mill and sugar refinery.

Who should attend this course?

Factory staff at a supervisory level who are involved with the laboratory function.

It is recommended that staff selected for this course have had at least **2 years** relevant experience in the sugar industry, as well as a scientific and or technical qualification at a tertiary level.

What is expected of the students?

The course is held **on-site** at the SMRI over a 2-week period. The course is split into two parts, each lasting one week. During the first week, the students are presented with the theory required, and in the second week, practical exercises and demonstrations will be conducted in the SMRI laboratories. The students will need to complete written tests and practical assessments to receive a certificate of completion.



Curriculum

Introduction

Sugarcane processing and the laboratory

Factory Performance calculations for chemists

- Factory balances and calculations
- Understanding and interpreting results in terms of day-to-day factory operations

Reporting

- Daily, weekly, monthly, and annual reports
- Working with your data management systems
- LIMS & Cane Lab
- Laboratory record-keeping
- Health & safety in the laboratory

Quality Control (QC) - raw and refined operations

- Managing raw & refined sugar quality
- Analyses associated with QC.

Water treatment chemistry – procedures and testing

- Water balance and water quality management
- Potable water
- Effluent
- Boiler feed water
- Condensate management
- Bearing, crystalliser and reheater water treatment
- Cooling towers

Instrumental analysis

- NIRS
- Specialist analytical techniques
- Sampling
- Microbiology

Practical lab-based sessions

- NIRS: practical use exercises, troubleshooting and maintenance
- General sugar-related laboratory analysis
- pH and redox
- Spectrophotometer
- Polarimeter and refractometer
- Care and calibration of Instruments
- Standard wet chemical methods
- Crystal size distribution



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Sugar Milling Research Institute NPC

Basic Sugar Technology for Canegrowers

The objective of this course is to provide growers with essential knowledge to better understand the role of the sugar mill in the sugar supply chain

Who should attend this course?

This popular online course helps growers understand the sugar-recovery process and factory performance calculations. It combines elements from the "From Stick to Crystal" course, providing insights into the calculations around sugar recoveries and losses. This course is ideal for both technical and non-technical staff.

Online learning

Participants will gain key insights into core processes relevant to their roles through online video lectures and quizzes.

The course enhances understanding of the sugar production process, with SMRI staff available for questions, creating a supportive learning environment. The lessons are delivered in a simple, easy-to-understand format, making sure that both newcomers and non-technical staff feel at ease.

The online format means that students can move ahead at their own pace so that studies can fit in with other commitments.

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When can I start?

SMRI members can enrol their teams in the "Basic Sugar Technology for Canegrowers" course at any time throughout the year. Although the course is usually completed within three weeks, students have up to six months to finish.

Curriculum

Part 1 - Sugar Industry Overview

Part 2 - Terminology and Basic Concepts

Part 3 - Harvesting and Cane Yard

Part 4 - Preparation and Extraction

Part 5 - Juice Preparation

Part 6 - Evaporation

Part 7 - Crystallisation

Part 8 - Centrifuging and Drying

Part 9 - Sugar Refining

Part 10 Factory Performance calculations.





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Boilers and Refineries Course

The objective of this course is to provide students with essential knowledge to better understand the role of cane sugar refineries and boilers.

Who should attend?

For professionals working in refineries, we offer the specialised Boilers and Refinery Course. This programme combines essential elements of boiler and steam systems with refining processes.

Although it does not delve as deeply as the Advanced Programme, it provides a comprehensive overview that is highly valuable for refinery personnel. Completion of the "From Stick to Crystal" introductory course is a prerequisite.

Online learning

Participants will gain valuable insights into essential processes related to their roles through online video lectures and quizzes.

The lessons are presented in a clear and easy-to-understand format, ensuring that all students feel comfortable. The online format allows students to progress at their own pace, enabling them to balance their studies with other commitments.

When can I start?

SMRI members can enrol their teams in the "Boilers and Refinery Course" at any time throughout the year, and are given 6 weeks to complete the course

Curriculum

Boilers

- Description and Configuration
- Heat transfer
- Steam Boilers
- Turbo Alternators
- Boiler Operations, Safety and Efficiency
- Cogeneration.

Refining

- Effect of raw sugar quality on refining
- The nature of colourants
- Primary colour removal
- Secondary colour removal
- Additional colour removal methods
- Crystallisation: Boiling and colour transfer

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Batch pan boiling course

Theory into practice

Objectives

This short course is a practical demonstration of how pan-boiling theory is applied in practice. Upon completion of this course, the students will be able to carry out the necessary calculations to both guide and evaluate batch pan boiling.

Who should attend this course?

The course on batch pan boiling in a raw sugar mill is offered at two levels: a two-day advanced program for supervisory staff and a three-day basic program for pan boilers, both at the SMRI.

Supervisory students should have a solid understanding of pan boiling theory and complete online prework beforehand. The basic level includes a full day of lectures on pan-boiling theory. Both supervisory-level and basic level students experience two practical days in which the theory is demonstrated practically learned theory.

What makes this course different?

The SMRI pilot 50-litre pan provides a chance to explore hypothetical situations on a scale that demonstrates the principles of crystallisation without the risk of losing significant amounts of sugar.

Working on this scale allows for a balance between theoretical calculations and practical application in an environment that encourages experimentation and in-depth discussion, allowing for a comparison between theory and observation.



Pre-course work

- ✓ The pre-course work needs to be undertaken before the two-day practical part of the course commences at the SMRI.
- ✓ For supervisors, the pre-course work will be provided online. For pan boilers, the theoretical aspects are provided via lectures at the SMRI.
- ✓ Students will learn the fundamentals of pan-boiling theory. These lectures will prepare them to conduct a pan calculation exercise. The spreadsheet used will be available for them to take home and apply in their factory.
- ✓ The calculations derived from the tutorial will be utilised to determine the necessary setpoints and decisions to be made during the on-site pan boiling sessions.



Practical -At the SMRI

The practical part of the course takes place over two days at the SMRI.

The focus on the first day will be on graining the pan using the calculations performed.

On the second day, students will grow the crystals and produce an A-massecuite.

These two days will demonstrate:

- The sensitivity of the graining point,
- The relationship between boiling point elevation and conductivity,
- Practical control of supersaturation,
- The consequences of poor supersaturation control,
- How false grain forms and how to prevent it,
- Measuring crystal growth, and
- Comparison between calculations and measurement.

To ensure that all students are given sufficient attention the course numbers are limited to 10 students per course.

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