This course is approved and subsidized by governmental agency, qualified for 14 PDUs by PEB (Professional Engineer Board), e2i training grant and PIC (40% cash payout) funding support.

Applied Metallurgy for Non-Metallurgists

- Composition, microstructure, processes and properties of metals and alloys

COURSE OVERVIEW

Metals and alloys are most widely used engineering materials in the various industries, facilities and infrastructures. It is essential for those professionals/engineers to have a better understanding of what metals (ferrous and non-ferrous) are, how they behave, how they can be made stronger or more corrosion resistant, how they can be shaped by casting, forging, forming, machining, and joined by welding, brazing and soldering, and how these processes can alter properties, and what kind of failures on metals could be anticipated.

This course is designed to give an overview of metallurgy with emphasis on application of physical metallurgy & mechanical metallurgy, broaden and deepen the attendants' knowledge and skills, help them to understand relationship between material's microstructures, processing, properties and performance, and solve problems in design, manufacturing, product quality, and maintenance, communicate more effectively with technical colleagues and customers.

COURSE DURATION:

Two days (8:30 am – 5:00 pm, 11– 12 December, 2017)

COURSE VENUE

Devan Nair Institute for Employment and Employability
80 Jurong East Street 21
Singapore 609607
(Nearby Jurong East MRT Station – access through J walk)

COURSE INSTRUCTOR

Dr George YU is Registered Chartered Engineer (UK), API 510 Pressure Vessel Inspector (USA), Executive Committee Member of The Institute of Materials (East Asia) and Technical assessor/expert of Singapore Accreditation Council. Dr YU has more than 30 years of relevant industrial work and research experience. As lead author, he published a number of technical papers in referred international journals and conferences. As Principal Investigator, he successfully completed more than 1000 projects on metallurgy related consultations, failure analysis, accident investigation and facility assessment/inspection, including damages of roller coasters, major MRT disruptions, accidents of cranes, aerospace engine damages, automotive steering system failure, lift rope breakage, landing gear system failure, hovercraft accidents, failures in gas and steam turbines, notebook computer burning, failures in jack-up rigs, great Singapore blackout, extra-hydrogen release of Submarine batteries, failures of PCB, PCBA, LCD & IC, heat exchanger burst, submarine power cable damages, transformer fire, explosion of power distribution system and switchgear, failures in building and structures etc. As expert witness, Dr YU was engaged in a number of litigation/court cases, including State Committee of Inquiry (COI) on major MRT disruptions and fatal crane accident in National Arts Gallery. He correctly determined root cause(s) of massive MRT disruptions on 7 July 2015, and his views were published in Top News of **Straits Times** on 30 July 2015.

COURSE CONTENT

1. Brief history of metallurgy.
2. Extractive Metallurgy.
3. Phase diagrams
4. Properties of metals (mechanical, physical and chemical).
5. Steels (carbon steels, alloy steels, stainless steels, tool steels)
6. Cast Irons (grey cast iron, malleable cast iron, ductile cast iron, white cast iron).
7. Nonferrous Metals: Industrial Applications and Properties - aluminium, titanium, copper, nickel and their alloys.
8. Strengthening Mechanisms: Techniques used to strengthen the metals.
9. Metal Forming: Forging, rolling, extrusion.
10. Metal Casting.
11. Metal machining and its effects on metals.
12. Joining techniques: welding, brazing, and soldering.
13. Heat Treatment of metals.
14. Introduction to failures of metals and alloys: ductile and brittle fractures, fatigue, wear, corrosion, creep, stress corrosion cracking etc.
15. How to select metals and alloys in design and applications

WHO SHOULD ATTEND

This is an ideal course for anyone without metallurgy background who need to gain a better understanding of metals and alloys as well as their applications in various industries such as aerospace, marine, construction, electrical & electronics, oil & gas, refinery, transportation. It has been designed for those without previous training in metallurgy, including engineers and professionals in design, manufacturing, quality assurance, maintenance, technical staff in laboratory, sales and marketing personnel; purchasers, management and administrative staff.

LEARNING OBJECTIVES

To enable participants to

- Understand what metals (ferrous and non-ferrous) are & how they behave.
- Know how to make metals stronger or more corrosion resistant.
- Understand how metals can be shaped, machined and joined.
- Know how to change metals' properties by processing/heat treatment.
- Understand what kind of failures on metals could be anticipated.
- Learn how to select right materials in applications.

So that the attendants can

- Communicate more effectively with technical colleagues.
- Be better informed and more efficient when dealing with customer enquiries.
- Avoid mistakes caused by lack of knowledge.
- Appreciate the properties and applications of relevant industrial alloys.

COURSE FEE

S$555/delegate after e2i training grant
Course material, refreshments, complimentary lunch arrangement and certificate will be provided.
10% discount is applicable for company with ≥3 pax, T & C.
e2i Training Grant (S$225/pax) is available for PMEs of Singaporean or PR with ≥ 75% attendance. T & C.
Companies can enjoy 400% tax deductions and/or 40% cash payout of course fee under PIC.

Terms and Conditions
• Course is subject to a first-come-first-serve basis in light of overwhelming responses. • Companies may replace participants who have signed up for the course, given one week notice before course commencement • UTC reserves the right to change or cancel any course, in light of unforeseen circumstances. Full refund is applicable in case of cancelation. • All details are correct at time of dissemination.

For registration or any queries, please visit website: ut.sg/UT-College.php, e-mail to enquiry@ut.sg or contact at Tel: 65-67759365.

Registration Form

Please register following delegate(s) in "*Applied Metallurgy for non-Metallurgists" course*

Delegate 1

Name: _____
IC No: _____
Designation: _____
HP/Phone: _____
Email:_____

Delegate 2

Name: _____
IC No: _____
Designation: _____
HP/Phone: _____
Email:_____

Delegate 3

Name: _____
IC No: _____
Designation: _____
HP/Phone: _____
Email:_____

Delegate 4

Name: _____
IC No: _____
Designation: _____
HP/Phone: _____
Email:_____

Company Name: _____

Company Address:

_____

Signature: _____Date: _____

Name: _____ Company stamp_____

The course fee for **Applied Metallurgy for non-Metallurgists** is S$780/delegate. Limited e2i training grant (S$225/pax) is available for PMEs of Singaporean or PR with ≥75% attendance. 10% discount is applicable for company with ≥3 pax **.** T & C.

Registration will be confirmed only after receiving the payment. Please email your registration form to enquiry@ut.sg. Registration will be closed 10 days before course commencement.

Cheque/Bankdraft payment

Make payable to *Universal Technology Centre LLP* .

Mail to "Universal Technology Centre", 10 Anson Road, International Plaza #10-11, Singapore 079903.

Bank transfer

Account No: 020-901961-6
Universal Technology Centre LLP

Bank name: DBS Bank Ltd
12 Marina Boulevard, DBS Asia Central
Marina Bay Financial Centre Tower 3
Singapore 018982