



**MURDOCH**  
**UNIVERSITY**

PERTH, WESTERN AUSTRALIA



## Professional Development Courses 2006

# Hydrometallurgy

*Supporting our industry*

*Enhancing your career*



Extractive Metallurgy, Murdoch University

# Fundamentals of hydrometallurgy

Basic: July 31- August 2, Perth

Advanced: August 3-4, Perth

## Basic Course Program

### Day 1

9:00 Introduction to hydrometallurgy  
10:30 Morning coffee  
10:45 Ions in solution  
12:30 Lunch  
1:30 Thermodynamics of solutions  
3:00 Afternoon tea  
3:15 Practical exercises

### Day 2

9:00 Redox equilibria  
10:30 Morning coffee  
10:45 Eh/pH diagrams I  
12:30 Lunch  
1:30 Eh/pH diagrams II  
3:00 Afternoon tea  
3:15 Practical exercises

### Day 3

9:00 Heterogeneous kinetics  
10:30 Morning coffee  
10:45 Electrochemical kinetics  
12:30 Lunch  
1:30 Mass transport  
3:00 Afternoon tea  
3:15 Practical exercises

## Advanced Course Program

### Day 1

9:00 Refresher of ionic solutions  
10:30 Morning coffee  
10:45 Advanced thermodynamics  
12:30 Lunch  
1:30 Speciation and modelling  
3:00 Afternoon tea  
3:15 Practical case studies

### Day 2

9:00 Advanced electrochemistry  
10:30 Morning coffee  
10:45 Kinetics of interfacial systems  
12:30 Lunch  
1:30 Mass and energy balances  
3:00 Afternoon tea  
3:15 Practical case

## COSTS

**Basic course - \$1650 + GST**

Registration closes 27 July

**Advanced Course - \$1300 + GST**

only runs if there are enough registrants

Registration closes 13 July

**Both courses - \$2700+GST**

Registration closes 13 July

Contact us for discounts on multiple attendees or courses.

This course can also be run on-site, please contact us to discuss your options.

For further information about mineral processing courses and enhancing your professional qualifications at Murdoch University, please visit our website

[www.scieng.murdoch.edu.au/mineral/index.html](http://www.scieng.murdoch.edu.au/mineral/index.html)

For details of the courses contact Nick Welham

[nicholas.welham@murdoch.edu.au](mailto:nicholas.welham@murdoch.edu.au) ☎ (08) 9360 2831

# Principles and practice of leaching

Basic: August 21-22, Perth

Advanced: August 24-25, Perth

## Basic Course Program

### Day 1

9:00 Chemical principles of leaching  
10:30 Morning coffee  
10:45 Thermodynamics of leaching  
12:30 Lunch  
1:30 Leaching kinetics I  
3:00 Afternoon tea  
3:15 Practical exercises

### Day 2

9:00 Leaching kinetics II  
10:30 Morning coffee  
10:45 Leaching of metals  
12:30 Lunch  
1:30 Leaching of oxides  
2:15 Leaching of sulfides  
3:00 Afternoon tea  
3:15 Practical exercises

## Advanced Course Program

### Day 1

9:00 Refresher on leaching  
10:30 Morning coffee  
10:45 Advanced leaching kinetics  
12:30 Lunch  
1:30 Bacterial leaching  
3:00 Afternoon tea  
3:15 Practical case studies

### Day 2

9:00 Pressure leaching I  
10:30 Morning coffee  
10:45 Pressure leaching II  
12:30 Lunch  
1:30 Solid-liquid separation  
2:15 Design of leach systems  
3:00 Afternoon tea  
3:15 Practical case studies

## COSTS

Basic course	\$1100 + GST	Registration closes 17 August
Advanced Course	\$1300 + GST	Registration closes 10 August
Both courses	\$2200 + GST	Registration closes 10 August

NOTE: The advanced course only runs if there are enough registrants and will be tailored to the interests of the attendees where practical

Contact us for discounts on multiple attendees or courses.

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# Separation processes in hydrometallurgy

Basic: September 18-19, Perth

Advanced: September 21-22, Perth

## Basic Course Program

### Day 1

9:00 Chemical principles  
10:30 Morning coffee  
10:45 Precipitation / crystallisation  
12:30 Lunch  
1:30 Solvent extraction I  
3:00 Afternoon tea  
3:15 Practical exercises

### Day 2

9:00 Solvent extraction II  
10:30 Morning coffee  
10:45 Adsorption processes  
12:30 Lunch  
1:30 Ion exchange  
3:00 Afternoon tea  
3:15 Practical exercises

## Advanced Course Program

### Day 1

9:00 Refresher on separation processes  
10:30 Morning coffee  
10:45 Cementation processes  
11:30 Advanced precipitation  
12:30 Lunch  
1:30 Advanced solvent extraction I  
3:00 Afternoon tea  
3:15 Practical case studies

### Day 2

9:00 Advanced solvent extraction II  
10:30 Morning coffee  
10:45 Advanced adsorption  
12:30 Lunch  
1:30 Advanced ion exchange  
3:00 Afternoon tea  
3:15 Practical case studies

## COSTS

Basic course \$1100 + GST

Advanced Course \$1300 + GST

Both courses \$2200 + GST

Registration closes 14 September

Registration closes 7 September

Registration closes 7 September

NOTE: The advanced course only runs if there are enough registrants and will be tailored to the interests of the attendees where practical

Contact us for discounts on multiple attendees or courses.

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# Precipitation, reduction and electrowinning

Basic: October 9-10, Perth

Advanced: October 12-13, Perth

## Basic Course Program

### Day 1

9:00 Precipitation / crystallisation  
10:30 Morning coffee  
10:45 Thermodynamics of reduction  
12:30 Lunch  
1:30 Cementation  
3:00 Afternoon tea  
3:15 Practical exercises

### Day 2

9:00 Pressure reduction  
10:30 Morning coffee  
10:45 Principles of electrowinning  
12:30 Lunch  
1:30 Electrowinning practice  
3:00 Afternoon tea  
3:15 Practical exercises

## Advanced Course Program

### Day 1

9:00 Advanced crystallisation  
10:30 Morning coffee  
10:45 Advanced electrode kinetics  
12:30 Lunch  
1:30 Electrorefining of metals  
3:00 Afternoon tea  
3:15 Practical case studies

### Day 2

9:00 Electrowinning of copper  
10:15 Morning coffee  
10:30 Electrowinning of zinc  
12:00 Electrowinning of gold  
12:30 Lunch  
1:30 Electrowinning of nickel  
2:30 Advanced pressure reduction  
3:00 Afternoon tea  
3:15 Practical case studies

## COSTS

Basic course	\$1100 + GST	Registration closes 5 October
Advanced Course	\$1300 + GST	Registration closes 29 September
Both courses	\$2200 + GST	Registration closes 29 September

NOTE: The advanced course only runs if there are enough registrants and will be tailored to the interests of the attendees where practical

Contact us for discounts on multiple attendees or courses.

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## REGISTRATION FORM

Please copy this form if you wish to send more delegates to any course. If you register three or more delegates to any course, or plan to attend three or more courses please contact us to discuss discounts.

These courses are all located in Perth, we can also run courses on-site, please contact us for details.

I wish to register for the following short course(s):

Fundamentals of Hydrometallurgy .....	basic .....	\$1815	[ ]
.....	advanced.....	\$1430	[ ]
Leaching Processes .....	basic .....	\$1210	[ ]
.....	advanced.....	\$1430	[ ]
Separation Processes .....	basic .....	\$1210	[ ]
.....	advanced.....	\$1430	[ ]
Metal Reduction Processes.....	basic .....	\$1210	[ ]
.....	advanced.....	\$1430	[ ]

..... TOTAL \$

### THESE FEES INCLUDE GST

Parker Centre for Integrated Hydrometallurgy Solutions

ABN: 27 437 324 492.

Name:.....

Company:.....

Address:.....

.....

Phone:.....Fax:.....

Email:.....

Please debit my    Bankcard    Mastercard    Visa    for the amount of \$

Card No. \_\_\_\_\_

Expiry date: \_\_\_\_\_

Cardholder Name \_\_\_\_\_

Signature \_\_\_\_\_

If you would prefer to be invoiced please complete the form and add any details necessary for invoicing, e.g. purchase number, financial officer etc

Please return the completed form to

Lyn Sunderland, Extractive Metallurgy, Murdoch University, South Street, Murdoch  
WA 6150

minmet@murdoch.edu.au

Fax:: 08 9360 6343