DEPARTMENT OF CHEMICAL ENGINEERING
PROCESS MODELLING, CONTROL AND OPTIMISATION UNIT
PROGRAMME FOR 2024 Rev 2024-01-29

FIRST SEMESTER (All dates below are subject to change & are based on the current UP calendar)

VENUES: Eng II 3-46, if presented in person, otherwise online

BLOCK 1	**Monday 19th February - Friday 23rd February 2024**	
	08:30 – 12:30	**13:30 – 17:00**
Mon. 19 Feb	CPO 732 (confirm Prof Heydenrych)	
Tue. 20 Feb	CBT 700 Mrs Marcelle Saffy	CBT 700
Wed. 21 Feb	CBT 700	CBT 700
Thu. 22 Feb	CSP 732 Prof de Vaal	CSP 732
Fri. 23 Feb	CSP 732	CSP 732
BLOCK 2	**Monday 8th April – Friday 12th April 2024**	
	08:30 – 12:30	**13:30 – 17:00**
Mon. 8th April	CSP 732	CSP 732
Tue. 9th April	CSP 732	CSP 732
Wed 10th April	CPO 732 (confirm Prof Heydenrych)	
Thu. 11th April	CBT 700	CBT 700
Fri. 12th April	CBT 700	CBT 700
BLOCK 3	**Monday 13th May - Friday 17th May 2024**	
	08:30 – 12:30	**13:30 – 17:00**
Mon. 13th May	CBT 700	CBT 700
Tue. 14th May	CBT 700	CBT 700
Wed. 15th May	CSP 732	CSP 732
Thu. 16th May	CSP 732	CSP 732
Fri. 17th May	CPO 732 (confirm Prof Heydenrych)	
Exam	**CPO 732: Confirm Assignment submission date with Prof Heydenrych** **CBT 700: Fri. 14th June 2024 Project submission** **Fri. 21st June 2024 Exam 08:30 – 11:30** **CSP 732: Thu. 27th June 2024 Exam 08:30 – 11:30** **Presentations: 13:30 – 17:00**	

SECOND SEMESTER (All dates below are subject to change & are based on the current UP calendar)

VENUES: Eng II 3-46, if presented in person, otherwise online

BLOCK 1	**Monday 15th July – Friday 19th July 2024**	
	08:30 – 12:30	**13:30 – 17:00**
Mon. 15th July	CBO 700 Prof P de Vaal	CBO 700
Tue. 16th July	CBO 700	CBO 700
Wed. 17th July	**CSK732 (Mr B du Plessis)**	**CSK732**
Thu. 18th July	CRO 700 (Only for fulltime M's)	CRO 700
Fri. 19st July	CML 732 Mr P Sonnendecker	CML 732
BLOCK 2	**Monday 26th August – Friday 30th August 2024**	
	08:30 – 12:30	**13:30 – 17:00**
Mon. 26th Aug	CML732	CML 732
Tue 27th Aug	CBO700	CBO700
Wed 28th Aug	CBO700	CBO700
Thu. 29th Aug	**CSK732**	**CSK732**
Fri. 30th Aug	CRO 700	CRO 700
BLOCK 3	**Monday 14th October – Friday 18th October 2024**	
	08:30 – 12:30	**13:30 – 17:00**
Mon. 14th Oct	CML732	CML 732
Tue. 15th Oct	CBO700	CBO700
Wed 16th Oct	CBO700	CBO700
Thu. 17th Oct	**CSK732**	**CSK732**
Fri. 18th Oct	CRO 700	CRO 700
Exam	**CBO 700: Fri. 22nd November 2024: 08:30 – 11:30** **Mon. 25th November 2024: 09:00 Take-home exam in** **CML 732: Fri. 29th November 2024: Presentation, Report & S/Ware** **CSK732: Fri. 15th November 2024: 08:30 – 12:30** **CRO 700 Submission date to be arranged with Lecturer**	

CBO 700/707: Multivariable Control System Design 700
CBT 700/707: Multivariable Control Systems Theory 700
CSP 732: Process Control System Development 732
CIP 732: Process Integration 732 **(Will not be presented in 2024)**
CML 732: Model-based Control Laboratory (Project-based module)
CRO 700: Research Orientation 700 (Project-based module)
CSK 732: Separation Technology 732
CPO 732: Product Design 732

UNIVERSITY OF PRETORIA
DEPARTMENT OF CHEMICAL ENGINEERING
PROCESS MODELLING, CONTROL AND OPTIMISATION UNIT
PRESCRIBED TEXT BOOKS (2023) (Rev. 2024-01-29)

REQUIRED BACKGROUND:

It is assumed that candidates will have a thorough knowledge of the content of the following standard undergraduate text books (It will be assumed that students will have a copy of at least one of the first 4 titles):

1. Seborg, DE, Edgar, TF, Mellichamp DA, Doyle, FJ III, *Process Dynamics and Control*, Wiley, 3rd Edition, (2011) International Student Version ISBN: 978-0-470-64610-6)
2. Marlin, T.E.; Process Control: *Designing Processes and Control Systems for Dynamic Performance*; McGraw-Hill, 2nd edition, 2000 (ISBN 0-07-039362-1)
3. Luyben, W.L.;*Process Modeling, Simulation and Control for Chemical Engineers*, 2nd edition, 1991, McGraw-Hill. (Process Control)(ISBN 0-07-100793-8)(Out of print)
4. Stephanopoulos, G., *Chemical Process Control*, Prentice-Hall 1984 (Process Control) (ISBN 0-13-128596-3) (Out of print)
5. Sinnott, R.K. (Ed); *Coulson & Richardson's Chemical Engineering Volume 6 (Design)*; Pergamon, 1993. (Process Design)(ISBN 0-08-041866x).

FIRST SEMESTER:

CBT 700 Multivariable Control Systems Theory 700 – Lecturer: Mrs Marcelle Saffy
Prescribed:
1. Skogestad, S., I. Postlethwaite; *Multivariable Feedback Control: Analysis and Design*; John Wiley & Sons, 1996. (ISBN 0-471-94330 4)

2. The following open source software can be downloaded and used:
   - OpenModelica http://www.openmodelica.org
   - Anaconda Python distribution (Python 3.5 version): https://www.continuum.io/downloads

CSP 732 Process Control System Development 732 - Lecturer: Prof PL de Vaal
Recommended reading: Mulley, R.; Control System Documentation: Applying Symbols and Identification; ISA, 1994.

CRO 700 Research Orientation 700 (Project-based module) – Lecturer: Various (Only for fulltime M's)
No prescribed books.

CPO 732 Product Design 732 – Lecturer: Prof M Heydenrych
Prescribed:
1. Cussler, E.L. and Moggridge, G.D.; Chemical Product Design. Cambridge Academic Press, 2001
2. Seider, W.D., Seader, J.D., Lewin, D.R.; Product and Process Design Principles - Synthesis, Analysis and Evaluation; John Wiley & Sons, 2nd edition, 2004; (ISBN 0-471-45247-5)(WIE)

SECOND SEMESTER:

CBO 700 Multivariable Control System Design 700 – Lecturer: Prof P de Vaal

Prescribed:
1. Roffel, B and Betlem, B (2007) Process dynamics and Control: Modeling for Control and Prediction, Wiley, USA, ISBN 978-0470016640
2. In addition to the software mentioned for **CBT700**, Matlab is a very significant commercial package, which is excellent – especially in a developmental environment. The Mathworks Inc.; Special dispensations for students can be negotiated with the local suppliers. The current release of MATLAB, Simulink, Symbolic Math functions, MPC toolbox and the Control Systems Toolbox are relevant. For cost of this software, contact: Optinum Solutions (Pty) Ltd, the local Matlab agent (011-325-6238), or http://www.mathworks.com

Recommended:
1. Maciejowski, J.M.; *Predictive Control with constraints*; Pearson Education Ltd; 2002; ISBN 0-201-39823-0 PPR
2. Dutton, K., Thompson, S., Barraclough, B.; *The art of Control Engineering*; Addison-Wesley Longman; 1998; ISBN 0-201-17545-2

CIP 732 Process Integration 732 – (This module will not be presented in 2024)

CML 732 Model-based Control Laboratory 732 (Project-based module) – Lecturer: Mr Paul Sonnendecker

Recommended:
1. Holman, JP (2001) *Experimental Methods for Engineers*, McGraw-Hill, USA ISBN 0-07-118165-2

CSK 732 Separation Technology 732 – Lecturer: Mr B du Plessis No prescribed textbook will be used.