CZECH TECHNICAL UNIVERSITY IN PRAGUE
Faculty of Nuclear Sciences and Physical Engineering
Department of Nuclear Reactors

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Course number: 03/2018

NTEC N32 - Experimental Reactor Physics

University of Manchester

March 5 – March 9, 2018

Monday March 5, 2018

Time	Activity
9:00 - 11:30	**Welcome meeting**
	• Course opening, course goals & scope • Organizational issues **Visit of the VR-1 Reactor** • Basic information about the VR-1 reactor • Design of the reactor VR-1, I&C, fuel IRT-4M • Walkthrough of the reactor facility
11:30 - 12:30	Lunch
12:30 - 16:00	**Neutron detection**
	• Gas filled neutron detectors • Distribution of the neutron flux in the reactor • Study of linearity and non-linearity of neutron detection (helium and boron detectors)

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Tuesday March 6, 2018

Time	Activity
9:00 - 12:00	**Delayed neutrons detection**
	• Delayed neutrons and their influence on reactor behaviour • Determination of delayed neutrons properties • Determination of fissionable material mass using delayed neutrons detection
12:00 - 13:00	Lunch
13:00 - 16:00	**Reactivity measurement**
	• Reactivity measurement by various methods: - Source Jerk method and Rod Drop method, - Source multiplication method - Positive period method

Wednesday March 7, 2018

Time	Activity
9:00 - 12:00	**Study of the reactor dynamics I**
	• Reactor behavior in critical, supercritical and sub critical state with and without the external neutron source • Influence temperature effects on behavior and operation of nuclear reactor - determination of thermal and reactor void coefficient
12:00 - 13:00	Lunch
13:00 - 16:00	**Study of the reactor dynamics II**
	• Reactor responses to different reactivity changes • Reactor behavior to the periodic reactivity changes • Pulse, transient and oscillation characteristics measurement

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Thursday March 8, 2018

Time	Activity
9:00 - 12:00	**Control rod calibration**
	• Control rod calibration by inverse rate method • Control rod calibration by reactimeter • Reactivity excess and shutdown margin
12:00 - 13:00	Lunch
13:00 - 16:00	**Critical experiment – approaching critical state**
	• Prediction of the reactor critical state by inverse rate method • Approaching the critical state at the VR-1 reactor by changes of control rod position

Friday March 9, 2018

Time	Activity
9:00 - 11:30	**Digital control and safety systems of the VR-1 reactor**
	• Demonstration of control system functions • Training of VR-1 reactor control by students
11:30 - 12:30	Lunch
12:30 - 13:30	**Exit Meeting**
	• Discussion & Conclusions