

## **NUCLEAR TECHNOLOGY EDUCATION CONSORTIUM**

### **N02 NUCLEAR FUEL CYCLE**

#### **Summary**

To introduce and develop subject knowledge and theoretical, conceptual and analytical skills in the nuclear fuel cycle, which encompasses mining, fuel manufacture, reprocessing, storage and recycling or disposal.

On completion, students should be able to:

- Explain the processes involved in the front- and back-ends of the once through fuel cycle
- Critically review the advantages/disadvantages of fuel reprocessing with spent fuel management
- Critically discuss the waste arising from each stage of the nuclear fuel including segregation and disposal
- Explore the challenges of emerging, competitive energy forms such as MOX, fast reactors and nuclear fusion.

#### **Syllabus**

The key areas covered in this course involve:

- An overview of the fuel cycle,
- mining and milling of uranium,
- purification and conversion to UF<sub>6</sub>,
- uranium enrichment,
- fuel fabrication,
- properties of irradiated fuel,
- nuclear fuel reprocessing,
- recycling of uranium and plutonium,
- spent fuel management,
- disposal of nuclear waste and
- emerging nuclear technologies

Please note that reactors are not included as part of N02 but are covered by other NTEC modules and that the nuclear fuel cycle in N02 is described with a scientific bias.

**N.B. this module does not include pre-printed lecture material: these will be found on the relevant Blackboard site.**