

## Project proposal template – Faculty studentships Summer 2014

<i>Project title</i>	Condition Monitoring and Fault Tolerance in Rotating Machinery Using Magnetic Bearings	<i>Director of Study</i>	Dr. Mohamad Askari
<i>Second Supervisor</i>	Prof. Necip Sahinkaya	<i>School</i>	Aerospace and Airconf <input type="button" value="v"/>
<i>Other members of supervisory team</i>		<i>Any requirements from applicant (eg degree in specific subject area)</i>	Degree in Engineering

**Project summary**  
(max 1,000 characters)

Condition monitoring of rotating machinery using vibration analysis have traditionally been carried out by signal analysis approach. Furthermore Modal Testing have been widely used in passive structures, it is proposed to use Modal testing to detect malfunctions in rotating machinery using a magnetic bearing as an actuator and measuring the response using piezoelectric sensors and subsequently deriving the Frequency Response Functions to extract the modal characteristics from the test data. Correction and compensations can then be applied by the magnetic bearings. The research involves overcoming the practical difficulties of measuring the necessary data as well as developing the mathematical procedures to account for centrifugal and gyroscopic forces and sudden changes in system dynamics or external disturbances. Finite Element and MATLAB can help with the mathematical modelling of such systems, subsequently the experimental data could be used to update the FE models and develop accurate models of the systems.