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**ADAM SMITH COLLEGE**  
INSPIRING LEARNING

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# Course Handbook

**NC Mechanical Engineering**

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## Welcome to Adam Smith College

This is the Course Handbook for the NC Mechanical Engineering. On behalf of the Course Team I would like to warmly welcome you to Adam Smith College. We feel sure that you will enjoy your time spent here.

To help you make the most of your time at College and to familiarise you with your course we have produced this course handbook. In here you will find information about the structure of your course, the teaching and learning styles used and the ways in which your work will be assessed and graded.

There is a considerable amount of information contained in this handbook, some of which will be of greater relevance to you as you work through the course than it is at the start of your studies in the College. However, we recommend that you read this Course Handbook through carefully **now**, then keep it safely - you will need to use it through your course.

We hope you will find the handbook a useful guide to your course and wish you every success in your studies.

Colin Rollo

Curriculum Head: NC Mechanical Engineering

## Information about your course

Your course is:

NC Mechanical Engineering

Your Curriculum Head is:

Colin Rollo

His/Her office is:

ES04, Stenton Campus

His/Her telephone number is:

01592 223355

His/Her email address is:

[colinrollo@adamsmith.ac.uk](mailto:colinrollo@adamsmith.ac.uk)

Scheduled guidance time:

As per timetable

## **Your Curriculum Head**

Each course in the Adam Smith College is assigned a Curriculum Head, whose role is to provide you with advice and support through your course of study. This falls roughly into two categories – guidance related to your studies and pastoral care to help you deal with any difficulties you might encounter of, for example, a personal, financial or health-related nature.

At the beginning of your course you will agree your learning targets with your Curriculum Head. These will be recorded on your Learner Agreement which both of you will sign. Throughout your course, your Curriculum Head will monitor your progress and meet with you regularly during the year to discuss how you are getting on.

Your Curriculum Head will also be available at a set time each week when you can meet if there's something you need to discuss. However, if something comes up which has to be dealt with urgently, you can ask to speak to your Curriculum Head at any time. He/she might not be able to meet you immediately – Curriculum Heads have classes to teach and other students to look after – but he/she will offer you an appointment as soon as possible or refer you to another appropriate member of staff.

Your Curriculum Head may not always be able to personally provide you with the sort of help or support you need, in which case he/she might recommend that you are referred to a member of the College's Guidance or Learning Support staff.

So, if at any time throughout your course, you experience difficulties which are affecting your progress as a student, your Curriculum Head should be your first contact. Please remember that unresolved problems rarely just go away. On the contrary, they tend to get worse the longer they're not dealt with. So, speak to your Curriculum Head sooner rather than later.

## **Your attendance at college and part-time employment**

Your success as a student depends on full and regular attendance at **all** classes. You should inform your Curriculum Head as soon as possible if you have problems with attendance. Our records show that students who do not attend all their classes have a very high risk of failure.<sup>1</sup>

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<sup>1</sup> For full details of regulations about attendance, see the College Attendance Policy and Procedure.

We recognise that you may need to undertake part-time work, but we strongly advise you not to take employment of more than 15 hours a week if you are a full time student. Should you need to take employment of more than 15 hours per week we recommend you register as a part time student. A full time student is expected to follow their timetable and negotiate work times around it.

## Your learning

Your College course will provide you with constant opportunities to learn new skills and acquire knowledge in your chosen subject areas. In order to make the most of all the opportunities available, you need to organise and plan your learning and also to manage your time effectively.

You must attend **all** your timetabled classes. You also need to study in your own time and you should plan to spend several hours a week to fulfil your commitment as a full-time student. You need to allocate time for this in your diary.

Prepare for lectures and tutorials by doing any reading or exercises in advance. Always make some notes – there is usually a handout provided. Review these after the class and ask your lecturer if there is anything you do not understand.

Note assignment deadlines and exam dates in your diary and remember to begin assignments early. You will enjoy researching and planning your work if you allow yourself plenty of time. Make sure you understand what you need to do and plan how you are going to tackle it. Seek advice from your lecturer or Curriculum Head if there is anything that needs clarification.

For full details of regulations about attendance, see the College Attendance Policy and Procedure.

In summary:

- ❖ plan your learning strategy
- ❖ allocate enough time
- ❖ attend **all** of your classes
- ❖ start assignments well in advance
- ❖ seek advice and help
- ❖ use the learning resources offered
- ❖ enjoy the learning experience!

## **Credit for previous learning**

Some students have previous experience or qualifications for which they may receive credit on their present course of study. If you have any qualification that may exempt you from part of your course, for example from school or another college, you may apply for Accreditation of Prior Learning (APL). Similarly, if you have undertaken work, paid or voluntary, that has resulted in learning skills or knowledge that is equivalent to units you will be studying here, you may apply for Accreditation of Prior Experiential Learning (APEL). Together these are known as AP(E)L and it means you do not have to duplicate study you have done previously. It does not necessarily have to be in your chosen subject, but it must be at the same level as your course of studies here.<sup>2</sup>

If you wish to claim for APL/AP(E)L please speak to your Curriculum Head.

## **The aims of your course**

The aims of your course are:

- ❖ to develop your knowledge of the facts, theories, concepts, applications, development and importance of mechanical engineering as in industry;
- ❖ to enhance your practical skills in basic workshop skills
- ❖ to provide a sound basis for those of you who may decide go on to a more advanced course of study;
- ❖ to give you experience of the equipment, materials, processes and practices currently used in manufacturing, process and other industries.
- ❖ to encourage your development of effective learning strategies.

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<sup>2</sup> For full details of the scheme for crediting previous learning, see the College Credit Transfer and APL/APEL Procedure.

## The structure of your course

The course consists of 18 units, with a total value of 18 credits.

The course consists of 3 formal classes each week along with individual study and coursework.

The units you will study in Semester 1 are:

Semester 1		
Unit Code	Unit Title	Credit
F3GB12	Communication	1
F3HX12	Maths Technician 1	1
F5FM12	Engineering: Applying Information Technology	1
F5JE12	Thermofluids	1
F5JG12	Graphical Engineering Communication	1
F5K612	Engineering Dynamics : An Introduction	1
F5K812	Statics	1
F5KC12	Engineering Manufacturing Processes	1
F5KD12	Engineering Materials	1

The units you will study in Semester 2 are:

Semester 2		
Unit Code	Unit Title	Credit
F3HY12	Maths Technician 2	1
F5FM12	Engineering Quality : An Introduction	1
F5H512	Computer Aided Draughting for Engineers	1
F5HV12	Industrial CNC Part Programming	1
F5JB12	Pneumatics and Hydraulics	1
F5K712	Engineering Dynamics	1
F5K912	Strength of Materials	1
F5KB12	Engineering Dimensional Control	1
F5KE12	Engineering Workshop Skills	1

## **The content of your course**

Here are brief descriptions of the units which make up your course:

### **F3GB12 - Communication**

This Unit is about using your reading, writing, speaking, and listening skills in complex situations in your personal life, at work, and in education.

### **F3HX12 - Mathematics: Technician 1**

In this Unit you will develop skills in numeracy, graphical communication, trigonometry and algebra to solve practical problems.

### **F5FM12 - Engineering: Applying Information Technology**

This Unit is designed to provide candidates with a basic knowledge and understanding of engineering quality. During the delivery of this Unit, candidates will learn about terminology commonly used in quality assurance systems. They will develop the knowledge and understanding to produce process models for engineering products or service and explain the ways in which input factors influence the quality of such products or services. Candidates will also learn how functions and individuals in organisations contribute to the quality of products or services. They will also carry out an engineering inspection relevant to the engineering area they are studying.

### **F5JE12 - Thermofluids**

This Unit is designed to provide candidates with knowledge and understanding of engineering thermofluids. During delivery of the Unit candidates will learn to determine the properties of working fluids and sketch thermodynamic properties on pressure-volume (p-V) diagrams. Candidates will also develop the knowledge and understanding to solve problems involving the non-flow and steady flow energy equations and solve problems relating to hydrostatic pressure and pressure measurements. Candidates will also learn to solve problems involving the application of the mass continuity and Bernoulli's equations as applied to incompressible flow in pipes.

### **F5JG12 - Graphical Engineering: Communication**

This Unit is designed to allow candidates to develop their knowledge, understanding and skills in graphical engineering communication. During the delivery of the Unit candidates will learn to extract and interpret information from documents used in engineering. They will also develop the knowledge and skills to create detailed, two dimensional drawings in both First and Third Angle Projection which include both auxiliary and sectional views. Candidates will also learn how to produce fully developed engineering assembly drawings.

### **F5K612 - Engineering Dynamics: An Introduction**

This mainly theory based Unit is designed to provide candidates with basic knowledge and understanding of engineering dynamic quantities, laws and principles so that they can use these to solve problems in dynamics. During the delivery of this Unit, candidates will learn about the basic quantities, and their units, used in engineering dynamics. They will also develop the knowledge and understanding to solve linear system problems involving the use of the equations of motion, velocity/time diagrams and Newton's Laws. Candidates will also learn to solve linear system problems involving work, energy, conservation of energy and power. They will also develop the knowledge and understanding to solve angular dynamic system problems.

### **F5K812 - Statics**

This Unit is designed to provide candidates with basic knowledge and understanding of Statics. During the delivery of the Unit candidates will learn to differentiate between scalar and vector quantities and identify the properties and effects of the application of force on a body, component and structure. They will also develop the knowledge and skills to solve problems involving forces in a plane as well as being able to analyse simple, idealised frameworks. Candidates will also learn to determine the effects of force on simple components.

### **F5KC12 - Engineering Manufacturing Processes**

This Unit is designed to provide candidates with an opportunity to develop their knowledge and understanding of both traditional manufacturing processes such as forming, joining and machining and modern manufacturing processes such as electro-discharge machining and rapid prototyping. Candidates will also learn how to select the appropriate manufacturing processes for the manufacture of given components and plan the sequence of operations for the manufacture of components.

### **F5KD12 - Engineering Materials**

This Unit is designed to provide candidates with knowledge and understanding of engineering materials. During delivery of the Unit candidates will learn to state the names and applications of a range of engineering materials and describe the properties of engineering materials. They will also develop the knowledge and understanding to describe changes in the structure and properties of engineering materials due to cold working and annealing. Candidates will develop the knowledge and skills to carry out mechanical tests on engineering materials and develop conclusions based on the results obtained from these tests.

### **F3HY12 - Mathematics: Technician 2**

This Unit is intended primarily for those candidates who wish to develop further their knowledge and understanding of Mathematics at SCQF level 6 with a view to supporting and underpinning their studies in an engineering discipline. In such cases, delivery of the Unit should be set within the context of the award to which it contributes. The Unit is designed to develop aspects of the candidate's skills in numeracy, algebra and calculus, and to apply these skills in the appropriate engineering context. It is envisaged that the content of each Outcome is delivered and assessed with specific reference to the candidate's engineering specialism, where appropriate.

### **F5FM12 - Engineering Quality: An Introduction**

This Unit is designed to provide candidates with a basic knowledge and understanding of engineering quality. During the delivery of this Unit, candidates will learn about terminology commonly used in quality assurance systems. They will develop the knowledge and understanding to produce process models for engineering products or service and explain the ways in which input factors influence the quality of such products or services. Candidates will also learn how functions and individuals in organisations contribute to the quality of products or services. They will also carry out an engineering inspection relevant to the engineering area they are studying.

### **F5H512 - Computer Aided Draughting for Engineers**

This largely practical Unit is designed to allow candidates to develop knowledge, understanding and skills in Computer Aided Draughting. During delivery of the Unit candidates will develop the knowledge and skills to use a commercial CAD system to create detailed, two-dimensional engineering drawings with auxiliary and sectional views. They will also import components and symbols into engineering drawings. Candidates will also develop the knowledge and skills to use a CAD system to modify existing two-dimensional drawings and create an assembly drawing.

### **F5HV12 - Industrial CNC Part Programming**

This Unit is designed to allow candidates to develop their knowledge, understanding and skills in part programming of Industrial Computer Numerical Control (CNC) machines. During the delivery of the Unit candidates will learn to interpret and re-dimension component drawings to suit CNC procedures. They will also develop the knowledge and understanding to plan operational layouts from supplied component drawings. Candidates will also learn to create and verify manual CNC part programmes.

### **F5JB12 - Pneumatics and Hydraulics**

This largely practical Unit is designed to provide candidates with knowledge, understanding and skills of pneumatic and hydraulic circuits. During delivery of the Unit candidates will learn how to interpret pneumatic and hydraulic components and component symbols and describe the operation of fluid power components. They will develop the knowledge and skills to draw and simulate pneumatic and hydraulic circuits. Candidates will also learn how to design, assemble and test pneumatic or hydraulic circuits as well as developing the knowledge and skills to perform basic fault finding techniques on pneumatic or hydraulic circuits and rectify faults. Candidates will develop practical skills and safe working practices whilst assembling and testing pneumatic or hydraulic systems.

### **F5K712 - Engineering Dynamics**

In this Unit you will develop knowledge and understanding of engineering dynamic quantities, laws and principles applied to both linear and angular dynamic systems. You will learn to manipulate and evaluate linear and angular dynamic equations to solve problems in dynamics, including systems containing linear and angular elements.

### **F5K912 - Strength of Materials**

This largely theory based Unit is designed to provide candidates with basic knowledge and understanding of Strength of Materials in an engineering context. During Unit delivery, candidates will learn to use shear force and bending moment diagrams to solve problems involving simply supported beams and cantilevers. They will also develop the knowledge and understanding to apply simple bending theory to idealised beams and apply simple torsion theory to solve problems involving shafts of circular cross-sectional area.

### **F5KB12 - Engineering Dimensional Control**

This Unit is designed to enable candidates to carry out a range of measurements on engineering components. During delivery of the Unit, candidates will learn about common measurement systems, standards and units used in engineering. They will also learn to describe common sources of error that occur in engineering measurements and describe methods for the minimisation of such errors. Candidates will also develop the knowledge and skills to use appropriate measuring equipment to undertake linear, angular and internal measurements on components. They will also learn techniques for adjusting and setting measuring equipment prior to use.

### **F5KE12 - Engineering Workshop Skills**

This predominantly practical Unit is designed to provide candidates with knowledge and skills in complex engineering workshop handskills. During delivery of the Unit, candidates will learn to interpret and extract information from engineering drawings and other sources in relation to

performing engineering workshop skills. They will also learn to select and use tools to mark out complex profiles for given specifications. Candidates will also learn how to complete planning documentation, and develop the knowledge and skills to select and use engineering tools to produce components and an assembly to given specifications. Throughout the delivery of the Unit candidates will learn and apply current health and safety requirements and safe working practices as they produce the components and assembly.

## **Assessment of your work**

Throughout your course, your work will be assessed in a number of different ways, depending on the different criteria in individual units.<sup>3</sup>

The majority of courses delivered in the College are assessed partly or wholly on a continuous basis – in other words, you will be assessed on parts of your work as you go along rather than all of it at the end of the unit. This assessment is carried out by the lecturer teaching the unit.

So that assessments can be fair to all students, and whoever teaches them, internal assessments are checked by other lecturers teaching the same, or similar, units. This is a process called 'internal moderation'.

Over and above the internal moderation of assessments of student work, awarding bodies check that colleges are assessing work appropriately by a process called 'external verification'. This process involves the awarding body carrying out checks on College staff's assessments of student work. This is done by sending 'external moderators' to the College, where they check assessments against national standards.

Only after these three stages have been completed can you be sure of your results, the certificates for which will be sent to you directly by the awarding body, not the College.

Internal assessment is not just about judging whether you have passed or failed. It also provides both you and your lecturers with important information about what you're doing well and where you have shortcomings in your knowledge, understanding or skills. Assessment is closely linked to the learning process in the sense that the feedback you will receive from your lecturers will help you improve your work in the future.

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<sup>3</sup> For full details of the College's regulations about assessment, see the College's Assessment Procedure.

Finally, a range of courses delivered in the College are assessed by means of an externally-set and externally-assessed examination. The examining body will inform you directly whether or not you have completed your course successfully. College lecturers are not in a position to tell you whether you have passed or failed, until they have been informed by the examining body (usually at the same time as you will know directly from the examining body). If in doubt, please ask your lecturer about the procedures used.

### **Re-assessment of your work**

If you are unsuccessful in an internal assessment, you will be offered the opportunity to be re-assessed. Depending on the arrangements for re-assessment laid down for a particular unit, this may involve retaking either the whole assessment or just part of it.

You will normally only be allowed one (or, in exceptional circumstances, two) re-assessment opportunities.

### **Submission of your coursework**

You should hand all coursework in to your course lecturer or if unavailable to staff room ES04 FSC Stenton.

All coursework for assessment will have a specified deadline for submission. It is essential that you meet the submission deadline to ensure fairness amongst all students and to enable staff to mark efficiently.

Your subject lecturer may allow you an extension to a submission date if there are valid circumstances affecting your ability to meet the deadline.

Any coursework (for which there are no mitigating circumstances or an agreed extension) handed in after the submission deadline will normally receive a mark of 0.

If you are unwell when completing assessed coursework or sitting examinations, or have any other specific difficulties that may affect your performance in assessed coursework or examinations, you should notify your Curriculum Head in writing of the circumstances as soon as possible, and make immediate arrangements for medical certificates or other letters of support to be submitted.

## **Cheating and plagiarism**

There are various forms of academic dishonesty but in the student's context it means cheating in examinations or presenting work for assessment which is not your own.

Plagiarism as a form of cheating takes place when the student 'borrows' or copies information, data or results from an unacknowledged source, without quotation marks or any indication that the presenter is not the original author or researcher.

If carried out knowingly, cheating and plagiarism have the objective of deceiving examiners and this threatens the integrity of the assessment procedures and the value of your award.

Work produced by someone else may be summarised or repeated providing it is referenced to the original author. As well as text, work such as diagrams, maps and charts must also be acknowledged. In addition to the use of quotation marks when quoting from original sources and secondary material, full reference for both quotes and paraphrases or summaries of published material must be given. All references should then be included in a bibliography at the end of the piece of work. Appropriate references for web-based material must also be given, including the relevant URL.

Any student found to have used unfair means in any examination or assessment procedure will be penalised.<sup>4</sup>

## **Support for your learning**

The College has a positive policy of supporting students with learning difficulties or disabilities and their interests are represented by the Diversity Committee which reports directly to the Principals Group. The College has a Learning Support team, which can provide help and advice on all aspects of learning support and coping with learning difficulties.

The College offers support in making alternative arrangements for exams and assessment, support with study skills and advice with applications for the Disabled Students Allowance. Support and advice

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<sup>4</sup> For full details of the College's regulations on cheating and plagiarism, see the College Academic Deceit Procedure.

can also be provided in the specification and purchase of specialist equipment and the use of Information Technology.

In order to ensure that you are provided with the appropriate advice and support from the start of your studies it is important that you discuss any difficulties and special requirements with the Learning Support Manager, or with your Curriculum Head, as early as possible.

## **Your representation**

Each course in the College is required to have a Course Team. This meets at least twice a year to review the course and consists of the Curriculum Head, all member of staff who teach units on the course and two representatives from the students on the course.

Prior to each meeting, your course representatives will be given a copy of the agenda and will be asked to consult their fellow students about the items listed and be prepared to report to the meeting on any issues raised.

Following the meeting, the class representatives will receive a copy of the Course Review report to share with their fellow students on the course.

The existence of the formal system of student representation doesn't mean that you should feel this is the only channel open to you. You may of course raise issues directly with a lecturer or your Curriculum Head. Individual problems are often likely to be more easily and quickly resolved in this way.

## **Your comments, complaints or compliments**

Naturally, we hope that your experience at the Adam Smith College will be an enjoyable and rewarding one. However, we do recognise that sometimes things can go wrong and encourage you to make your comments or complaints known to us so that we have the opportunity to resolve the problem and improve our services to you.

Problems are often most quickly and easily sorted by being dealt with informally. So we would ask that, in the first instance, you raise the matter with the appropriate member of staff. If you're not satisfied with the outcome, you can discuss the matter with your Curriculum Head.

Comments or complaints can also be put forward through your course representatives.

Where informal methods have failed to resolve the problem, you can make a formal complaint through the College's Complaint Form, which is available at Reception on all College campuses and in outreach centres or through the Students' Association.

It's always good to hear about what you think we do well and we encourage you to use the Compliments Form available at Reception. Every compliment received will be passed on to the person or department it's about.