

Holy Family Catholic School

Curriculum Overview Year 10 –

Technology: Design Tech (GCSE)



	Curriculum Content	Suggested Reading or Extension Activities
Half Term 1 (Sept-Oct)	Siege Engine: Design Brief: The History department wants to put on a display of vintage weapons that were used in primeval times. These weapons have to be powered by natural power examples such as string tension, swinging motion, gravity, etc. Description: Using 10 x 10mm recycled timber, card, string and hot melt glue, pupils must make a siege engine of their choice. Appropriate research must be completed. Appropriate research opportunities: Internet, use of modelling techniques with cards. Timber and hot melt glue. Investigation of appropriate materials. Environmental issues. Modern methods of weaponry. Multi Material opportunities: Investigating the properties of timber, card, plastic and string. Modelling with wood and/or foam Opportunities to manufacture in quantity: Evaluate one-off, batch and mass production using appropriate methods of manufacture. Tasks: - Produce sketches of a variety of siege engines (SE) using appropriate hand rendering techniques and CAD. (Label functions). - Carry out a full product analysis of SE, produce a disassembly drawing and label. - Students produce five initial ideas (A4 size) showing components and manufacturing techniques. (Produce flow chart). - Students to choose best design SE based on the information gathered and model from card or other suitable medium available,	- Research types of siege engines/catapult. - Research types of forces. - Appropriate materials for modelling such as balsa wood, MDF, Foamboard, Polystyrene, etc. - Properties of card, timber and plastics. - Types of production methods. - The use of 2D Techsoft and google sketchup. Download the ONSHAPE (3D software)online version- It's free, just register with your school email and start drawing! https://www.onshape.com/en/education/

	Theory 1. Systems approach to designing. 2. Mechanical devices. 3. Materials and their working properties	• Materials and their properties.
Half Term 2 (Nov-Dec)	Siege Engine (continue): • Investigate the effects and variations of different types of SE on the environment – In pairs, students make a working project and present it to class. Competition is encouraged. • Students take digital photographs. Making/Realising the chosen ideas. Theory 1. New and emerging technologies. 2. Energy generation and storage. 3. Development in new materials.	• EXTENSION Exercise: 1) pupils create a suitable package of their project. 2) As a requirement, pupils will present their work in pairs as part of the class competition. 3) How can you improve the portability of the SE. • Use Design and Technology (9-1) text book, and Design and Technology workbook.
Half Term 3 (Jan-Feb)	Test Tube Holder: • Research existing products of two test tube holders. • Carry out simple product analysis of similarly constructed test tube holders. • Writing the design brief. • Stating the design specification/criteria of the product intended to make. • Drawing range of design ideas. • Use appropriate software to design and develop the final idea (CAD). • Modelling and developing the design ideas. • Making/Realising the photo holder. • Evaluating the final product. Health and safety issues: • Wear aprons and eye protection. • One person must work on a machine at a time. • Hold work firmly when using the pillar drill. Theory 1. Selection of materials. 2. Forces and stresses. 3. Ecological and social footprint. 4. Sources and origins.	• Use the Product Analysis sheet as a guide. • Appropriate materials for making test tube holders such as plastics, metals and wood. • The use of 2D Techsoft and google sketchup. Download the ONSHAPE (3D software)online version- It's free, just register with your school email and start drawing! https://www.onshape.com/en/education/ • Use Design and Technology (9-1) text book, and Design and Technology workbook.

Half Term 4 (Feb-Mar)	Photo Holder: • Research existing products and appropriate materials. • Carry out simple product analysis of similarly constructed test photo holders. • Writing client/customer/user profile. • Writing the design brief. • Stating the design specification/criteria of the product intended to make. • Drawing range of design ideas. • Modelling and developing the design ideas. • Making/Realising the photo holder. Health and safety issues: • Wear aprons and eye protection. • One person must work on a machine at a time. • Hold work firmly when using the pillar drill. Theory 1. Using and working with materials. 2. Stock forms, types and sizes. 3. Scale of production. 4. Specialist techniques and processes. 5. Surface treatment and finishes.	• Use the Product Analysis sheet as a guide. • Appropriate materials for making photo holders such as plastics, metals and wood. • The use of 2D Techsoft and google sketchup. Download the ONSHAPE (3D software)online version- It's free, just register with your school email and start drawing! https://www.onshape.com/en/education/ • • Use Design and Technology (9-1) text book, and Design and Technology workbook.
Half Term 5 (Apr-May)	Moving toy mechanism and Linkages: Design Brief: Pupils need to know and understand how to use CAD/CAM to create and assemble children's toy with simple moving mechanics. Pupils always see objects in motion. In mechanics, motions happen as a result of levers and linkages. Pupils are to design any form of linkage with corresponding motion. This could be used further to make a unique product. Description: Using 2D techsoft and google pupils create their own designs and transfer their files to either the laser cutter or the 3D printer. They must know how settings are done once the file is transferred before the CNC machine carries out the information. Theory: • Investigate two mechanical toys and how it works. • Disassembly – How can it be improved?	• Research types of linkages, types of forces, types of movement, and cams. • Appropriate materials for making mechanisms such as plastics, metals and wood. • The use of 2D Techsoft and google sketchup. Download the ONSHAPE (3D software)online version- It's free, just register with your school email and start drawing! https://www.onshape.com/en/education/ •

	• Design of mechanical grabber. • Card modelling to create a mechanism. • Design developing using a variety of sketching techniques. • Making – Show variety of materials and processes. • Evaluation of the finished product. • Investigation, primary and secondary. • Environmental, social and economic challenges. • The work of others • Design strategies. • Communication of designs • Prototype development. • Selection of materials. • Tolerances. • Material management. • Specialist tools and equipment. • Specialist techniques and processes.	• Use Design and Technology (9-1) text book, and Design and Technology workbook.
Half Term 6 (Jun-Jul)	Coursework: A01: Identifying and Investigating design possibilities <u>Identify and investigate design possibilities</u> (10 marks) • Select the one contextual challenge from the three Contextual challenges given. • Do a detailed introduction and explanation of the Contextual challenge selected. <u>Content:</u> Describe what the context selected is all about; Mention your user and target market; State both primary and secondary research about the challenge. What impact will the information gathered have on a possible product to meet the challenge? <u>Conclusion:</u> Relate your investigation to the contextual challenge. How will the information address the needs of the user/client? Do a mind map to explore the contextual challenge. You may consider using 5WH. <u>Mood board</u>	• Contextual challenge from AQA. • Mind map to explore understanding of the challenge. • Use of 5WH

Introduction: Begin the page with the reason why you are making the page by telling the areas you will consider and what you are going to talk about.

- Design a mood board for your product. This must include design/cultural influences and design movement, images the client wants, what you intend to make, and inspirational images.

Evaluation: Summarise the information you have on your mood board. Relate your investigation to the contextual challenge. What did the information find out? What ideas have you got from this?

Consumer/Client/User/Target market profile

Introduction: Begin the page with what you are going to talk about.

Who is the product aimed at? Give a brief history of your target market. What he/she does, interest, likes and dislikes, where does he/she shop and why? Etc.

Evaluation: How will the information about your client/customer/target market help you to be as accurate as possible to the design brief? Clearly identify the client or user.

Interview with the client

Introduction: Begin the page with what you are going to talk about.

Come out with some questions you may want to ask your client with possible answers based on the product you intend to make. Design table of results. Plot graphs for each question.

Evaluation: What did the interview find out? Relate this to the contextual challenge. Always consider the user/client needs and wants.

Existing Products Analysis (Work of others)

Introduction: Begin the page with the reason why you are doing the research.

Get at least 2 pictures of existing products of what you want to design and make.

Evaluation: Conclude the page with your opinion on all the products of your findings. You can compare them and suggest what you want the product to be or to have. Relate your investigation to the contextual challenge and the user needs and wants.

- Appropriate images, inspirational images, and Design Movement.

- Talking to the client to get to know the client's needs and wants.
- Research and investigate the consumers or users of the potential product.

- Talking to the client to get to know the client's needs and wants.

- Use Product Analysis worksheet or ACCEFM sheet to analyse the product(s).

	<u>Product Disassembly</u> <u>Introduction:</u> Begin the page with what you are going to talk about and tell why you chose the product you are going to analyse. Get an existing product, disassemble it and describe the function, material, safety, users, colour, size, manufacture, cost, ergonomics, anthropometrics, etc. Describe with photos. <u>Evaluation:</u> End the page with how the project you have analysed will help you to make the product. What problems are you going to encounter? Relate this investigation to the contextual challenge as well as the user needs and wants. What did you find out from this investigation?	• Use Product Analysis worksheet or ACCEFM sheet to analyse the product(s).
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Examples of Home Learning Tasks	As per whole school assessment cycle pupils will be tested on a mid-project assessment as well as an end of project assessment which is in keeping with the whole school data drops schedule. Year 10 mock.
Assessment Tasks, Methods & Frequency	Pupils will get a taste of drawing in 2D and 3D software just as Architects, engineers, game designers and artists do.
Equipment that Students Need	Plain papers/Pen/Pencil/Colour pencils/ green pen/eraser/sharpies for the H&S posters

Parent / Carers can help their child by:	Youtube, https://www.onshape.com/en/education/ www.howitworks.com , www.bbcbitsize.co.uk
Useful Websites	Youtube, https://www.onshape.com/en/education/ www.howitworks.com , www.bbcbitsize.co.uk Use Design and Technology (9-1) text book, and Design and Technology workbook
Extra-Curricular Activities & Career Opportunities	STEM club

Who Can I Contact?	Head of Technology	Miss L. Jaber
	Teachers of Year 10 Technology	Mr.P.Kwarteng/ Mr D. Shabani

Holy Family Catholic School

Curriculum Overview Year 11 –

Technology: Design Tech (GCSE)



	Curriculum Content	Suggested Reading or Extension Activities
Half Term 1 (Sept-Oct)	Coursework (continue): <u>Social, Moral, Economic and Environmental challenges, and Commercial viability</u> Social, economic and moral issues: Consideration for mass production. E.g. cheap labour countries, job opportunities, child labour, legal issues, etc. Sustainability and Environmental issues: Talk about 6R's (Recycle, Reuse, Reduce, Rethink, Repair, Refuse); CE; Lion Mark; 0-3 age safety; British Kite mark; fair trade, global warming, etc. Commercial viability: Tell and explain how the product could be sold. E.g. online; advertising; amazon; eBay; etc. Remember that the product should have the potential to be commercially viable to meet the client's needs. <u>Evaluation</u>: How do the issues you have considered affect the product you want to make? How do they relate or imply to your contextual challenge, user needs and wants? Reflect on the impact on society. <u>Human Factor</u> <u>Introduction</u>: Begin the page with the need to consider human factors when designing. Get images of anthropometrics and ergonomics, talk about them and relate to what you intend to make. <u>Evaluation</u>: How will this knowledge affect the design to meet the client needs and wants. <u>Research Analysis</u> <u>Introduction</u>: Use this page to summarise all the investigations you have carried out. The research includes Mood board; Client interview; Client profile; Existing Product analysis; and product Disassembly. <u>Evaluation</u>: What did you actually find out in your research? How will the research done and the knowledge you have now going to influence your	- Investigate issues of cheap labour countries, job opportunities, child labour, legal relating to intended product. - Investigate sustainability and environmental issues: Talk about 6R's (Recycle, Reuse, Reduce, Rethink, Repair, Refuse); CE; Lion Mark; 0-3 age safety; British Kite mark; fair trade, global warming, etc. - Use Design and Technology (9-1) text book, and Design and Technology workbook. - Summarise all the investigations done so far.

	design work? How are you going to use it in your design? Make sure investigation work actually informs the design ideas.	
Half Term 2 (Nov-Dec)	Coursework (continue): <u>A01: Identifying and Investigating design possibilities</u> <u>Producing a Design Brief and Design Specification (10 marks)</u> Based on the above investigation you now have a clear idea of what you want. Use this page to write your design brief. This is a brief statement of what you are going to make. It should be lengthy to explain and address what you are going to make. <u>Design Brief:</u> E.g. “Based on the above investigation and my clients’ needs, I would like to design and make a” <u>What must be included in your design brief:</u> • What is going to be designed and made, based on your investigations and client’s needs. • The target audience/target market (Users/Customers). • The purpose of the design. Why is the product needed? I.e. the problem the product needs to solve. • The brief overview of how it should work. • What will it look like? What materials will be used to make the product? Note: Everything you say must be based on the previous investigations and your client’s needs and wants. <u>Design Specification</u> <u>Introduction:</u> This page is about the requirements of what you are making. Use the specification sheet to tell the specific requirements of the product you are making. Design specification must be meaningful, well justified and the criteria should be measurable. <u>Conclusion:</u> Conclude the page with the summary of your requirements. Any criteria you state should be measurable, relevant, and have real purpose.	• Write a brief state of what you intend to make based on previous investigation. • Use the design specification sheet.

Always remember to focus on the clients' or users' needs and wants.

A02: Design and make prototypes that are fit for purpose

Generating Design Ideas (20 marks)

Introduction: Give a brief introduction of what the page is about.

- Draw at least 6 different design ideas of the product you want to make. Note that your designs must be imaginative, creative, original, imaginative and innovative and push yourself to explore more unusual ideas. Your ideas must be from your research/investigation, basic shapes (oval, square, triangle, circle, rectangle, etc.) and inspiration, taking into account your client/user needs and wants. The designs must address your contextual challenge. Note that the ideas must be quality and well annotated.
- Avoid design fixation (not open to new ideas).
- Always take into accounts the on-going investigation.
- Use a wide range of techniques such as isometric, perspective, rendering (shading), etc.
- Comment (with full annotation) on all the drawings about how the design will work to satisfy your design specification. Show/Draw the type of joint for all the ideas.
- There must be quality of ideas and not the quality of sketches.

Evaluation (Client's opinion):

Conclude the page by selecting the ideas you may like to further develop. What does your client/user think about each of the ideas you are selecting? Note that in commenting, students must always make reference to their product based on design specification and user needs and wants. You must render (shade) all the drawings to make them real.

Evaluation of design ideas

Introduction: This page is about evaluating some of the design ideas and making a section of what idea(s) you may want to develop and make.

- Make a table to compare at least 2 ideas from your design ideas that you want to develop against all the design specification. Also seek the user's opinion.

- Use knowledge from Year 9 ICT 2D and 3D drawings.
- Talking to the clients and users about the ideas generated. See their opinion.

- based on the design specification and user needs and wants, evaluate all the ideas and select 2 for further development.

Conclusion (Client's opinion):

Give a brief summary of the outcome of your comparison and mention the idea(s) you are going to develop. Always relate any investigation to the contextual challenge and user needs. Relate your designs to the specification, taking account of the clients' thoughts and consider their suitability.

Developing Design Ideas (20 marks)

Development of ideas with CAD

Introduction: What is the reason why you want to develop your idea(s) with any computer software?

- You must use any software (Google sketch-up, 2D design, Pro-desktop) to draw the idea(s) you are developing in 3D. You must Comment and annotate your idea(s).
- Show photographic evidence of the CAD drawing from different views and comment on each of them.
- What software did you use to develop your idea?
- How did you draw it?
- What tools did you use?
- Is it difficult or easy to make?
- Do very good and comprehensive annotations to explain your development/changes.

Client's opinion:

- What does the user/client think about the development or changes so far?
- Mention problems you faced when making. How did you solve these problems?
- Give reasons why you like or dislike certain aspects of the design.
- How does the design match your specification?

Development of ideas with modelling

Introduction: What is the reason why you want to develop your idea(s) by card/Styrofoam modelling?

- You must use a card/Styrofoam/foam board to develop your idea(s). You must Comment and annotate your idea(s).
- Why did you model your chosen idea (s)?
- Show photographic evidence of the model from different views and comment on each of them.
- Tell how you made the model.
- What material was used? Why did you use these materials?
- List some properties of materials used.

- The use of 2D Techsoft and google sketchup. Download the Sketchup online version- It's free, just register with your school email and start drawing!
<https://www.sketchup.com/products/sketchup-for-web>

- Use appropriate materials to model and text the chosen ideas/ideas.

	- Is it difficult or easy to make? <u>Client's opinion:</u> - What does the user/client think about the development or changes so far? - Mention problems you faced when making. How did you solve these problems? - Give reasons why you like or dislike certain aspects of the design. - How does the design match your specification? <u>Development of ideas with CAM</u> <u>Introduction:</u> What is the reason why you want to develop your idea(s) with CAM? - You can use any CNC machine such as Laser cutter or 3D printer to develop the idea(s) in 3D. You must Comment and annotate your idea(s). - Show photographic evidence of the CAM model from different views and comment on each of them. - What CNC machine did you use to develop your idea? - How did you use it? - Is it difficult or easy to make? <u>Client's opinion:</u> - What does the user/client think about the development or changes so far? - Mention problems you faced when making. How did you solve these problems? - Give reasons why you like or dislike certain aspects of the design. - How does the design match your specification?	- Seek your client's opinion before arriving at a conclusion. - The use of 2D Techsoft and google sketchup. Download the Sketchup online version- It's free, just register with your school email and start drawing! https://www.sketchup.com/products/sketchup-for-web
Half Term 3 (Jan-Feb)	Coursework (continue): <u>Testing of Materials</u> <u>Introduction:</u> Begin the page with the reason why you want to investigate/research into possible materials you can use to make your product. - Present the page with photos of some of the possible materials and components you can to make your product. E.g. wood, plastic, metal types. (Note: Don't research materials that you are not going to use). - State the properties of the materials.	- Research different types of materials that will be appropriate for making the final prototype. - Make meaningful conclusions.

- If possible, use the images of the real/actual materials.

Evaluation:

- Now be specific of the choice of the materials and components you are using and tell the reason behind your choice. Justify the materials and components selected.
- What does your client think about the choice of materials?

The use of joints and finished

Introduction: Begin the page with the reason why you want to investigate/research into possible joints and finishes you can use to make your product.

- Present the page with photos of some of the possible joints and finishes you can use to make the product. E.g. lap, dowel (pin), finger, mitre joints etc. Finishes include varnishing, painting, waxing, polishing, dip coating, etc.
- Why do you need this type of joint or finish?
- Draw or make the joint to see how it will work. I.e. test the joint.

Evaluation:

- Now be specific of the choice of the joint and finish you are using and tell the reason behind your choice. Justify the joint and finish selected.
- What does your client think about the choice?

Analysis of development

Introduction: Give a brief introduction of what the page is about.

- Compare your developed ideas. You can do the analysis by making a table with some design specifications stated earlier and compare the designs.

Conclusion:

Which idea are you going to take as your final idea and make? Now that you have finished modelling your idea(s), how is this experience going to help you to make your product? What material do you think you can use to make your product?

Final design idea with google sketch-up/2D Techsoft or hand drawn

- Drawing, making and testing different types of wood joints.
- Applying on woods and metals.
- Drawing, making and testing different types of metal joints.
- Drawing a table to summarise/evaluate all the development against some of the specification points.
- Evaluating the final design against design specification.

	<u>Introduction:</u> Give a brief introduction of what the page is about. • Draw the final idea in 3D with Google sketch-up or any software. Comment and annotate the final ideas with dimensions. <u>Evaluation the final design against design specification</u> <u>Introduction:</u> Give a brief introduction of what the page is about. • Evaluate the final design idea against all the design criteria (specification). <u>Evaluation:</u> What is so unique about your design? How does the final design satisfy the design criteria? Relate it to the contextual challenge and user needs. <u>Client's opinion:</u> What does your client think about the final idea? <u>Orthographic Projection</u> Present the final idea in orthographic projection showing the Front Elevation, Side Elevation, Plan (Top) views with dimensions and scale. Show the 3rd (Third) angle projection symbol. <u>Manufacture Specification</u> <u>Introduction:</u> Give a brief introduction of what the page is about. Manufacturing Specification is the list of information a manufacturer needs to produce the product. This must include the materials and standard components (such as screws, nails, electrical components, etc.) to be used during manufacturing. <u>Conclusion:</u> Justify the information produced to inform the manufacturer. Explain your decisions.	• Drawing a table to summarise/evaluate all the development against some of the specification points. • Show the final design from three different angles (Front, Side, Top) with scale, dimensions, and type of projection (3rd angle projection).
Half Term 4 (Feb-Mar)	Coursework (continue): <u>Realising the Design Idea (20 marks)</u> <u>Cutting List</u> Make a cutting list using the Focus Education Software. <u>Production Plan</u> List the entire step-by-step plan in logical order of how the final product will be made.	• Show each step of making/production with health and safety and quality control checks.

Start each sentence with a verb.

Photographic record of making

Begin the page with what you are going to do. I.e. write the reason why this page. Record key stages involved in making of the prototype project. You must provide comprehensive notes and photographic evidence of each stage of making. Demonstrate a high level of making skills.

Highlight all the quality control checks. Also state any problems faced and how you solved them.

A03: Analysing, evaluating and testing (20 marks)

Personal evaluation

Personally analyse and give your opinion about your finished project. What do you like/dislike about your prototype? Why? Talk about your strengths and weaknesses. Are there any changes?

Evaluation against design specification and manufacture specification

Critically evaluate your project against your design specification. Tell the things you have achieved and what you have not been able to achieve.

Conclusion: Tell overall achievement. What have you enjoyed about the project?

User/Client evaluation

You have already identified your user/client. Ask your client to evaluate the finished product. This can be done with questions and answers. He/she can also test the product and give you his/her feedback.

Conclusion: Tell overall achievement. What has your client enjoyed about the project?

Peer (third party) evaluation

Ask questions on the product made and ask between 3 to 5 people to respond to those questions.

Evaluation:

Analyse and evaluate your peer/client's response.

Example: Seven out of ten liked the colour of my project.

Now give your own opinion on what others are saying.

- Each step of making must be shown with photos, and identify quality control checks.

- Generate questions you can ask your client.

- Generate questions you can ask your peers.

	<u>Testing of project</u> Test the product to see how best it works. You must do that with pictures/photos. Test how it functions (works), stability, strength, durability, fit for purpose, etc. <u>Modifications</u> You can list all the possible changes you made when making your product. Now state and explain any modification (Changes) you could make if given another opportunity to make it again. Don't forget to take into account all the suggestions made during evaluation above. Give meaningful conclusions leading to proposals for further development, modification or improvements of product and system designed to control manufacture. Note: It is very important to draw the modified version of the product to show the changes you could make. Do very detailed annotation. <u>Modification for commercial production</u> (<u>Note</u>: Only include this page if you think your product is <u>not a prototype</u> and that it can be further developed using any production methods). Justify the need for modifications to the product and consideration given as to how the outcome might need to be modified for commercial production. Talk about industrial practices such as Just-In-Time production (JIT), Mass production, Batch production, Continuous production, etc. show with pictures. In what area or process of making could your product be produced in large quantity?	- There should be real testing of the finished product at the appropriate place with photos. - List all the changes you could make when given the chance to resign again. - How could the product be made commercially?
Half Term 5 (Apr-May)	Revision: Practise past papers and revision booklets.	GCSE Bitesize Art & Design https://www.bbc.co.uk/bitesize/subjects/z6hs34j Pinterest (to gather inspiration) YouTube when developing/practising a specific skill/technique. AQA Past Papers https://www.aqa.org.uk/find-past-papers-and-mark-schemes Design and Technology (9-1) text book, and Design and Technology workbook.
Half Term 6 (Jun-Jul)	External Exams: Practise past papers and revision booklets.	GCSE Bitesize Art & Design https://www.bbc.co.uk/bitesize/subjects/z6hs34j

		● Pinterest (to gather inspiration) ● YouTube when developing/practising a specific skill/technique. ● AQA Past Papers https://www.aqa.org.uk/find-past-papers-and-mark-schemes ● Design and Technology (9-1) text book, and Design and Technology workbook.
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Examples of Home Learning Tasks	As per whole school assessment cycle pupils will be tested on a mid-project assessment as well as an end of project assessment which is in keeping with the whole school data drops schedule. Year 11 mock.
Assessment Tasks, Methods & Frequency	Pupils will get a taste of drawing in 2D and 3D software just as Architects, engineers, game designers and artists do.
Equipment that Students Need	Plain papers/Pen/Pencil/Colour pencils/ green pen/eraser/sharpies for the H&S posters

Parent / Carers can help their child by:	Youtube, https://www.onshape.com/en/education/ , www.howitworks.com , www.bbcbitsize.co.uk
Useful Websites	Youtube, https://www.onshape.com/en/education/ , www.howitworks.com , www.bbcbitsize.co.uk Use Design and Technology (9-1) text book, and Design and Technology workbook
Extra-Curricular Activities & Career Opportunities	

Who Can I Contact?	Head of Technology	Miss L.Jaber
	Teachers of Year 11 Technology	Mr P.Kwarteng/ Mr D.Shabani