

Programme(s):	International Foundation Programme
Module Code & Title:	EF3036 Introduction to Engineering Design and Problem Solving
Distributed on:	January 2022
Word Limit:	1000
Weighting	Coursework is worth 40% of the total mark for this module.
Submission of Assessment	<p><i>You must submit your coursework to the appropriate Turnitin Submission Point in the 'Assessment' section of the 2021SEM2_EF3036FNN01 module site.</i></p> <p><i>Please do not email your coursework as an attachment unless you are asked to do so by a Programme Administrator or the Module Leader.</i></p> <p><i>It is your responsibility to ensure that your coursework arrives before the submission deadline stated above. Refer to the University policy on late submission of work (see below) for further information about this.</i></p>



Instructions on Assessment:

TASK

You will submit a written report evaluating energy efficiency in a given environment, which will assess your achievement of MLO2, as detailed above. You will compare and contrast ways to reduce energy wastage and present a sensible argument based on an audit of energy demands and cost.

- The word count for this report is 1000 words (excluding any tables, graphs, references, front/end matter etc.)
- You will use academic referencing (Harvard style) to cite sources used where appropriate.

REPORT CONTEXT

You are asked to write a report auditing energy use in a given environment, including a cost analysis, and a plan for improvements which would increase energy efficiency in that environment, reducing energy waste, and rely less on carbon-based fuels (therefore lowering CO₂ emissions).

The report will comprise two parts:

Part A: Undertake an energy audit for a three-week (21 day) period. You will be allocated an environment from the list below based on your student ID number. Your task is to analyse the energy usage in that environment, including the total costing based on the current energy prices and the amount of time any appliances are used. You will need to decide and specify which UK Gas and Electricity providers you intend to use in your study and follow their pricing methods accordingly, and utilise appropriate materials and sources to help communicate your analysis. Please include a screenshot as evidence of the pricing method chosen.

Environment List:

- Student ID number ending **00–30**: Cat Café
- Student ID number ending **31–60**: Hairdressers
- Student ID number ending **61–90**: Ice Cream Parlour
- Student ID number ending **91–99**: Photo Print Studio

Part B: By reference to Part A, discuss how energy loss (waste) and reliance on carbon-based fuels could be reduced in the allocated environment. Consider and compare changes to lifestyle and infrastructure, as well as design-based solutions, and use a persuasive writing style.

FORMATTING GUIDELINES

Please follow the guidelines below when writing your report, and check against them before submitting.

- The report should be word processed, and typeset in Times New Roman, font size 12 with 1½ line spacing
- You may wish to present the relevant data in Part A in a table
- Including any references or Appendices, the report should not exceed 8 pages
- The report should include a cover page, clearly indicating the student's:
 - ID number
 - Module name and code
 - Tutor name
 - Report title
 - Word count
- The report may include a contents page
- Any figures and tables should include a (numbered) caption
- The report should include an introduction (maximum 100 words) and a conclusion (maximum 100 words), and clearly indicate parts A and B.

SUPPORTIVE READING – can also be accessed via the module reading list

1. https://www.ukpower.co.uk/home_energy/tariffs-per-unit-kwh
2. Lecture notes for Term 2 Weeks 1/2/3 of this module
3. *Sustainable Energy – without the hot air* by David JC MacKay

BREAKDOWN OF MARKS

• Energy Audit	Part A	40%
• Cost Analysis	Part A	20%
• Energy Saving and Implementation	Part B	30%
• Overall Conclusions and References	-	10%

ADDITIONAL GUIDANCE ON ENVIRONMENT SPECIFICATIONS

The environments* considered in this report are:

- Cat Café
- Hairdressers
- Ice Cream Parlour
- Photo Print Studio

Each environment should be considered as a small, independent business for which the site includes living accommodation for the owner. This means there will be some energy-consuming units common to all, in addition to specialist equipment particular to the business under investigation. Your cost analysis should distinguish between personal and business costs.

The power ratings for specialist equipment, gas consumption information, and floor plans for each environment are shown below for guidance, in addition to power ratings for energy-consuming units common to all environments.

*Note that which environment you investigate depends on your student ID number, as detailed above.

Floor Plans

Key:

Code	Room	Code	Feature
B	Bedroom		Viewing window
Ba	Bathroom		Door
K	Kitchen		
L	Living Room		
H	Hall		
D	Dining Room		
SF	Shop Front		
St	Storeroom		
D/P	Dining/Play Area		
PB	Portrait Booth		

Cat Café: *Ground Floor*

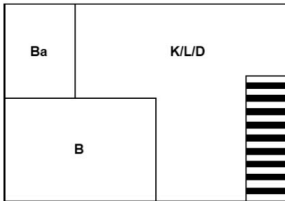
Cat Café: *First Floor*

Microwave Oven	1200
Backup electric heating	900
Surveillance cameras x 4	50
Electronic Till	100
Lighting (per room)	60
Refrigerator x 2	220
Water fountain	5
Hair straighteners x 10	100

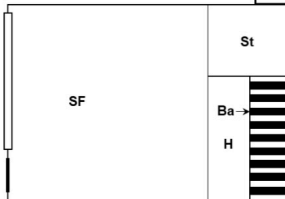
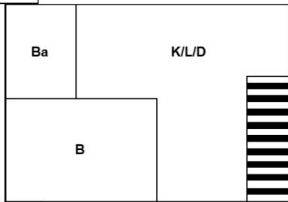
*Hair
resse
rs*

Hair Dryer (5x hand/3x 1500/2300 stand)

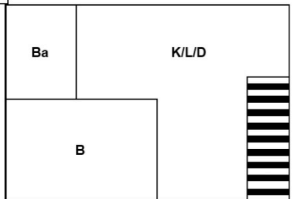
Business Phone	5
Radio	10
Lighting (per room)	60
Computer	300
Coffee Machine	800
Electronic Till	100
Kettle	1200



*individual rating
Standard Equipment by Room



Ice Cream Parlour: *First Floor*



Ice Cream Parlour: *Ground Floor*

	Energy-consuming Unit	Power Rating (W)
<i>Kitch</i>	Fridge/Freezer	150

	Oven	2000
	Electric Hob	1500
	Microwave Oven	800
	Coffee maker	800
	Blender	300
	Toaster	1200
	Kettle	1200
	Washing machine	700
	Tumble dryer	1250
	Lighting fixture-1	60
	Lighting fixture-2	60
<i>Living Room</i>	Television	90
	Phone charger	5
	Tablet charger	15
	Radio	10
	Lighting fixture-1	60
	Lighting fixture-2	60
	Lamp	60
<i>Bedroom</i>	Phone charger	5
	Tablet charger	15
	E-Reader charger	5
	Hair dryer	1000
	Lighting fixture	11
	Lamp	60
<i>Bathroom</i>	Electric shower	1000
	Lighting fixture (6 spotlights)	360
	Electric Shaver	20
<i>Hall</i>	Laptop Computer	40
	Printer	50
	Wi-fi Router	6
	Lighting fixture	11
	Vacuum Cleaner	500
	Iron	1000

Gas Usage:

In addition to the electricity usage specified, the heating systems for these environments use Gas. Annual use is given below:

Environment Annual Gas Usage (kWh)

Cat Café	14000
Hairdressers	13000
Ice Cream Parlour	11000
Photo Print Studio	12000

Late submission of work

Where coursework is submitted without approval, after the published hand-in deadline, the following penalties will apply.

For coursework submitted up to 1 working day (24 hours) after the published hand-in deadline without approval, **10% of the total marks available for the assessment shall be deducted** from the assessment mark.

For clarity: a late piece of work that would have scored 65%, 55% or 45% had it been handed in on time will be awarded 55%, 45% or 35% respectively as 10% of the total available marks will have been deducted.

The Penalty does not apply to Pass/Fail Modules, i.e. there will be no penalty for late submission if assessments on Pass/Fail are submitted up to 1 working day (24 hours) after the published hand-in deadline.

Coursework submitted more than 1 working day (24 hours) after the published hand-in deadline without approval will be regarded as not having been completed. **A mark of zero will be awarded for the assessment and the module will be failed**, irrespective of the overall module mark.

For clarity: if the original hand-in time on a working day is 12 noon then the 24-hour late submission allowance will end at 12 noon on the next working day (bank holidays and weekends are not classed as working days)

These provisions apply to all assessments, including those assessed on a Pass / Fail basis.

Word limits and penalties

If the assignment is within +10% of the stated word limit no penalty will apply.

The word count is to be declared on the front page of your assignment and the assignment cover sheet. The word count does not include:

- Title and Contents page
- Reference list
- Appendices
- Appropriate tables, figures and illustrations
- Glossary
- Bibliography
- Quotes from interviews and focus groups.

Please note, in text citations [e.g. (Smith, 2011)] and direct secondary quotations [e.g. "*dib-dab nonsense analysis*" (Smith, 2011 p.123)] are INCLUDED in the word count.

If this word count is falsified, students are reminded that under ARNA page 30 Section 3.4 this will be regarded as academic misconduct.

If the word limit of the full assignment exceeds the +10% limit, 10% of the mark provisionally awarded to the assignment will be deducted. For example: if the assignment is worth 70 marks but is above the word limit by more than 10%, a penalty of 7 marks will be imposed, giving a final mark of 63.

Students must retain an electronic copy of this assignment (including ALL appendices) and it must be made available within 24hours of them requesting it be submitted.

Note: For those assessments or partial assessments based on calculation, multiple choice etc., marks will be gained on an accumulative basis. In these cases, marks allocated to each section will be made clear.

Mapping to Module & Programme Learning Outcomes

The assessment has been designed to assess the module learning outcomes (MLOs), which themselves contribute to the programme learning outcomes (PLOs):

Module Learning Outcomes [MLOs]

Knowledge and Understanding (KU):

MLO2: Show understanding of the theoretical concepts of energy; carrying out simple calculations to improve the energy efficiency and design of domestic/ manufacturing environments

Intellectual / Professional skills & abilities:

Personal Values Attributes (Global / Cultural awareness, Ethics, Curiosity) (PVA):

Referencing your work

In-text citations give brief details of the work you are referring to in your text. References are listed at the end of the text in alphabetical order by the author's name. The general format of an electronic journal reference in the Harvard style is shown below:

Coutu, D. (2009). Why Teams Don't Work. *Harvard Business Review*, 87, 5, 98-105. Retrieved 29th April 2012 from EBSCO <http://searchebSCOhost.com>

Author/s name and initials are listed first, followed by year of publication in brackets. Then there is the title of

	Do not meet standard		Meets standard				Exceeds standard	
	0-29%	30-39%	40-49%	50-59%	60-69%	70-79%	80-89%	90-100%
Part A: Energy Audit. 40% Introduce the work in context and set out its aims. Present a suitable table of data for an energy audit and justify decisions made.	[0-11] Completely insufficient Work not submitted OR evidence of	[12-15] Insufficient energy audit Section incomplete or irrelevant.	[16-19] Adequate energy audit The introduction adequately	[20-23] Good energy audit. The introduction satisfactorily	[24-27] Very good energy audit. The introduction specifies the	[28-31] Excellent energy audit. The introduction specifies the	[32-35] Outstanding energy audit. The introduction specifies the	[36-40] Exemplary energy audit. The introduction specifies the

	serious academic misconduct. Introduction or energy audit missing. No evidence of the knowledge, understanding and skills appropriate to Level 3	The introduction is very brief or missing, failing to provide adequate context for the report. Choices regarding usage frequency and duration for energy-consuming units in the given environment are often poorly thought out. Clarity of data presentation is poor, with mistakes or missing information. Accompanying text is of poor quality and descriptive only, with over-reliance on material provided by the tutor Requires significant improvement.	specifies the context and aims of the report. Some logical choices have been made regarding usage frequency and duration for energy-consuming units in the given environment. Clarity of data presentation is adequate in that a table (or tables) of data has been presented with column headings and captions. Student has described the steps taken in the energy audit but the explanation of steps is brief or vague. Goes beyond the material tutor has provided, though section should be expanded further	specifies the context and aims of the report. Logical choices have generally been made regarding usage frequency and duration for energy-consuming units in the given environment. A clear table (or tables) of data has been presented with mostly suitable column headings and captions, broken down by room etc. Student has satisfactorily described and explained the steps taken in the energy audit. Section could be expanded further	context and aims of the report well. Logical choices have been made regarding usage frequency and duration for energy-consuming units in the given environment. A clear table (or tables) of data has been presented with suitable column headings and captions, broken down by room etc. Student has described and explained the steps taken in the energy audit in some detail.	context and aims of the report very well. Logical choices have been made in all cases regarding usage frequency and duration for energy-consuming units in the given environment. A clear table (or tables) of data has been presented with suitable column headings and captions, broken down by room etc. Student has described and explained the steps taken in the energy audit in considerable detail.	context and aims of the report incredibly well. Logical choices have been made in all cases regarding usage frequency and duration for energy-consuming units in the given environment and these are justified. A very clear table (or tables) of data has been presented with suitable column headings and captions, broken down by room etc. Student has described and explained the steps taken in the energy audit in considerable detail.	context and aims of the report exceptionally well. Logical choices have been made in all cases regarding usage frequency and duration for energy-consuming units in the given environment and these are justified. A clear, error-free table (or tables) of data has been presented with suitable column headings and captions, broken down by room etc. Student has described and explained at great depth the steps taken in the energy audit.
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Part A: Cost Analysis. 20% Carry out a cost analysis that distinguishes between business and personal energy costs, with worked examples of calculations.	[0-5] Completely insufficient Work not submitted OR evidence of serious academic misconduct. Introduction or energy audit missing. No evidence of the knowledge, understanding and skills appropriate to Level 3	[6-7] Insufficient cost analysis. The cost analysis is incomplete or irrelevant. There is no distinction between business and personal electricity costs, and gas usage has not been considered. The total cost for a three-week period has not been worked out. Some calculations are relevant and correct in the cost analysis but there is no working example shown for any calculation. Accompanying description of the steps taken in the cost analysis is insufficient.	[8-9] An adequate cost analysis has been completed, with a distinction drawn between business and personal electricity costs, or gas usage has not been included. The total cost for a three-week period has been stated. Most calculations are relevant and correct in the cost analysis, with at least one worked example calculation included (there may be up to three minor mistakes). The student has satisfactorily described the steps taken in the cost analysis.	[10-11] A good cost analysis has been completed, with a distinction drawn between business and personal electricity costs. Gas usage has been included in the costing. The total cost for a three-week period has been clearly stated. All calculations are relevant in the cost analysis, with at least one worked example calculation included (there may be one minor mistake). The student has described the steps taken in the cost analysis in some detail.	[12-13] A very good cost analysis has been completed, with a distinction drawn between business and personal electricity costs. Gas usage has been included in the costing and standing charges are considered. The total cost for a three-week period has been clearly stated. All calculations are relevant in the cost analysis, with at least one worked example calculation included. The student has described the steps taken in the cost analysis in detail.	[14-15] An excellent cost analysis has been completed, with a distinction drawn between business and personal electricity costs. Gas usage has been included in the costing, and standing charges are considered. The total cost for a three-week period has been clearly stated. All calculations are relevant and correct in the cost analysis, with at least two worked example calculations included. The student has described the steps taken in the cost analysis in detail.	[16-17] Outstanding cost analysis has been completed, with a distinction drawn between business and personal electricity costs. Gas usage has been included in the costing, and standing charges are considered correctly. The total cost for a three-week period has been clearly stated. All calculations are relevant and correct in the cost analysis, with at least two worked example calculations included. The student has described the steps taken in the cost analysis in considerable detail.	[18-20] Exemplary cost analysis has been completed, with a distinction drawn between business and personal electricity costs. Gas usage has been included in the costing, and standing charges are considered correctly. The total cost for a three-week period has been clearly stated. All calculations are relevant and correct in the cost analysis, with at least one worked example calculation included. The student has described the steps taken in the cost analysis at great depth.
Part B: Discussion. 30%	[0-6] Completely	[9-11] An insufficient	[12-14] An adequate	[15-17] A good	[18-20] A very good	[21-23] An excellent	[24-26] An	[27-30] An

Part B: Discussion, 30%. Describe and justify an energy saving and implementation plan, with reference to relevant	[0-6] Completely insufficient Work not submitted OR	[9-11] An insufficient discussion, being very brief, with no detail in any of	[12-14] An adequate discussion, exploring at least two energy-	[15-17] A good discussion, in which the student has explored and	[18-20] A very good discussion, in which the student has explored and	[21-23] An excellent discussion, provided in which the student has	[24-26] An outstanding discussion, in which the student has	[27-30] An exemplary discussion, in which the student has

sources.	evidence of serious academic misconduct. Introduction or energy audit missing. No evidence of the knowledge, understanding and skills appropriate to Level 3	the energy-saving solutions explored. Numerous deficiencies in expression and presentation. The writing is largely descriptive. Barely adequate or no use of literature.	saving solutions in detail, though not covering all areas (lifestyle, infrastructure, and product design). A simple and basic style but significant deficiencies in expression or format. The writing is largely descriptive. Some up to date appropriate literature mentioned.	compared a range of energy-saving solutions in some detail (at least three) across all areas (lifestyle, infrastructure, and product design). The tone is academically persuasive, with some solutions backed up by references to the literature, and satisfactorily explained. Written with only minor lapses from standard grammar, acceptable format.	compared a wide range of energy-saving solutions in some detail (at least four) across all areas (lifestyle, infrastructure, and product design). The tone is academically persuasive, with most solutions backed up by relevant, up to date references to the literature, and critically appraised	explored and compared a wide range of energy-saving solutions in considerable detail (at least six) across all areas (lifestyle, infrastructure, and product design). The tone is academically persuasive and engaging relevant, up to date sources and critically appraising each source Citing a wide range of relevant, up-to-date sources and critically appraising each source	explored and compared a very wide range of energy-saving solutions in detail (at least seven) across all areas (lifestyle, infrastructure, and product design). A compelling evaluation, originality and elegance of argument written with no errors, and citing an extensive range of relevant, up-to-date sources and critically appraising each source	
Conclusion/References, 10% Summarise the findings of the energy audit and the savings plan. Present a list of references.	[0-2] Completely insufficient Work not submitted OR evidence of serious academic misconduct. Introduction or energy audit missing. No evidence of the knowledge, understanding and skills appropriate to Level 3	[3] The conclusion is insufficient, being very brief, and not providing a clear summary of the report. References have not been used, or they are inappropriate or not cited in the text.	[4] An adequate conclusion, which is brief, but does summarise the main outcomes of the report, though it may lack some key numerical information. At least two references have been listed, though they may not have been well chosen, or cited correctly.	[5] A good conclusion, summarising the context and outcomes of the report well, and restating key numerical information from Part A. A range of references (at least three) are listed appropriately to back up arguments and numerical figures, and cited correctly.	[6] A very good conclusion, summarising the context and outcomes of the report very clearly, and restating key numerical information from Part A. A wide range of references (at least four) are listed appropriately to back up arguments and numerical figures, and cited correctly.	[7] An excellent conclusion, summarising the context and outcomes of the report succinctly and clearly, and restating key numerical information from Part A. A wide range of references (at least five) are listed correctly to back up arguments and numerical figures. They are cited correctly.	[8] An outstanding conclusion, summarising the context and outcomes of the report succinctly and clearly, and restating all key numerical information from Part A. A wide range of references (at least six) are listed without errors and appropriately to back up arguments and numerical figures. They are cited correctly.	[9-10] An exemplary conclusion, summarising the context and outcomes of the report succinctly and clearly, and restating all key numerical information from Part A. A wide range of references (at least seven) are listed without errors and appropriately to back up arguments and numerical figures. They are cited correctly.