Scheme of Work

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Course:	**Pearson BTEC Level 3 National Diploma in Civil Engineering**	**Unit/module:**	**15: Further Mathematics for Construction**	**Year:**	**2023-2024**
Tutor:	**Adewale Abimbola**	**Time:**	**35 Weeks, 1.75 hours per week**		

Week No	Week Completed	Syllabus Ref	Topic	Methods of Delivery	Resources	ESW Opportunities (How will you develop Literacy, Numeracy and ILT?)	Assessment/ Student Activity	Remarks (Please note opportunities for Equality and Diversity ESDGC, Wellbeing, Curriculum Cymraeg, Enterprise, etc. and any Health and Safety issues)
1-2		LA A	**Topic: Introduction to Unit 15 & Transposition Techniques** **Sample activities:** Presentation and discussion of the unit brief, Pearson-set theme and topics for student selection. Students to identify the equipment and media needed to produce their own construction drawings. Seminar and discussion of unit Learning Outcomes and Assessment Criteria.	T D GW CE Quiz	IWB C Handout DP WS	AN IT WWO IOLP	Q&A Discussion Group Work	Development of problem-solving skill. Development of numeracy skill. Overview of the unit in relation to the whole civil engineering and construction sectors.

Methods of Delivery: T – Talk, D – Discussion, GW – Group Work, RL – Role Play, CE – Class Exercise, WS – Worksheet, etc
Essential & Key Skills Opportunities: C – Communications, AN – Application of Number, IT – Information Technology, IOLP – Improving Own Learning & Performance, WWO – Working With Others, PS – Problem Solving, ESDGC (Education for Sustainable Development and Global Citizenship).
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			Presentation on transposing techniques. Students to transpose linear, quadratic, cubic, trigonometric, and logarithmic expressions/functions.					
3-4		LA A	**Topic: Trigonometric Techniques** **Sample activities:** Presentation on trigonometric techniques. Students, working in groups, solve trigonometric functions and are rules for triangles.	T D GW CE WS PowerPoint	IWB C Handout DP	AN IT WWO IOLP	Q&A Discussion Group Work	Development of problem-solving skill. Development of numeracy skill.
5 - 6		LA A	**Topic: - Construction-related Problems – Transposition and Trigonometric Techniques** Presentation on the application of properties of sections and trigonometry to determine dimensions in 2D and 3D. Students to apply trigonometric techniques to 2D scenarios to solve construction problems.	T D WS CE PowerPoint	IWB C Handout	C IT WWO PS	Q&A Discussion Group Work	Development of safety awareness in the design and construction processes. Development of problem-solving skill.
7		LA A	**Issue Assignment 1.** Students are introduced to the assessment process for the unit,	T WS Assignment Ref	C WS	IOLP PS	Assignment Ref Discussion	Development of research skills Develops an understanding of choices and decisions

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			revisit learning outcomes and criteria. Discussion of submission requirements for the unit.					Development of academic writing skill.
8-9		LA A	**Topic: Assignment 1 – Independent study & support sessions** Students, working individually, begin to identify resources required in relation to their proposed project. **Submit Assignment 1.**	T CE WS Assignment Ref	C WS	IOLP PS	Assignment Ref Discussion	Development of research skill. Develops an understanding of choices and decisions Development of academic writing skills
10 - 11		LA B	**Topic: - Differential Calculus – Standard Differential Calculus methods** Presentation on standard differential calculus methods. Students to use the method of differentiation to solve polynomial, trigonometric, logarithmic and exponential equations.	T D GW CE WS PowerPoint	IWB C Handout DP	AN IT WWO IOLP	Q&A Discussion Group Work	Work collaboratively in diverse groups Development of numeracy skill.

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12		LA B	**Topic: - Differential Calculus – Product Rule** Presentation on the use of product rule to produce derivatives of algebraic, trigonometric, logarithmic and exponential functions. Students to use the product rule method to solve polynomial, trigonometric, logarithmic and exponential equations. **Provide assignment 2 feedback.**	T D D CE	IWB C Handout	C IT WWO PS	Q&A Discussion Group Work	Work collaboratively in diverse groups Development of numeracy skill. Develops an understanding of choices and decisions Treating all students' submission equally and fairly.
13		LA B	**Topic: - Differential Calculus – Quotient Rule** Presentation on the use of quotient rule to produce derivatives of algebraic, trigonometric, logarithmic and exponential functions. Students to use the quotient rule method to solve polynomial, trigonometric, logarithmic and exponential equations.	T D GW CE WS PowerPoint	IWB C Handout DP	AN IT WWO IOLP	Q&A Discussion Group Work	Development of problem-solving skill. Development of numeracy skill.

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14		LA B	**Topic: - Differential Calculus – Stationary Values** Presentation on the use of second-order derivatives to determine the location of stationary values of trigonometric and algebraic functions. Students to use second-order derivatives to determine the turning points and points of inflexion of trigonometric and algebraic functions.	T D GW CE WS PowerPoint	IWB C Handout DP	AN IT WWO IOLP	Q&A Discussion Group Work	Development of problem-solving skill. Development of numeracy skill.
15-16		LA B	**Topic: - Integral Calculus - Standard Integral Calculus Method** Presentation on standard integral calculus methods. Students to use the method of integration to solve polynomial, trigonometric, reciprocal, and exponential equations.	T D GW CE WS PowerPoint	IWB C HandoutIT	C IT WWO PS	Quiz Q&A Discussion Group Work	Development of numeracy skill. Development of research skills
17		LA B	**Topic: - Integral Calculus - Definite Integral** Presentation on indefinite and definite integrals.	T D GW CE	IWB C Handout DP	AN IT WWO IOLP	Q&A Discussion Group Work	Development of problem-solving skill. Development of numeracy skill.

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			Students to produce Indefinite integration and notation, and definite integration with limits.	WS PowerPoint				
18-19		LA B	**Topic: - Integral Calculus – Irregular Areas and Volumes** Presentation on the application of formulae for irregular areas and volumes for numerical integration. Students to apply the trapezoidal rule, mid-ordinate rule, and Simpson's rule to various properties of sections.	T D GW CE WS PowerPoint	IWB C Handout IT	C IT WWO PS	Quiz Q&A Discussion Group Work	Development of research skill. Development of problem-solving skill.
20		LA B	**Issue Assignment 2.** Students are introduced to the assessment process for the unit and revisit learning outcomes and criteria. Discussion of submission requirements for the unit.	T WS Assignment Ref	C WS	IOLP PS	Assignment Ref Discussion	Development of research skills Develops an understanding of choices and decisions Development of academic writing skill.
21-22		LA B	**Topic: Assignment 2 – Independent study & support sessions** Students, working individually, begin to identify resources	T CE WS Assignment Ref	C WS	IOLP PS	Assignment Ref Discussion	Development of research skill. Develops an understanding of choices and decisions

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			required in relation to their proposed project. **Submit Assignment 2.**					Development of academic writing skills
23		LA C	**Topic: Statistical methods – Types of Data and Presentation of Data** Presentation on types and presentation of data. Students to distinguish between discrete, continuous, grouped and ungrouped data. Students to present data using histograms, bar charts, pie charts, and frequency graphs.	T D GW RL CE WS	IWB C Handout	C AN IT WWO PS	Q&A Discussion Group Work Quiz	Development of research skill. Development of problem-solving skill. Develop IT skills with the use of MS Excel.
24		LA C	**Topic: Statistical methods – Sampling Distribution** Presentation on sampling distributions. Students, working individually, begin to produce one-, two-, and three-point basic perspectives. Students, working individually, produce normal distribution tables, confidence limits, and significance testing exercises.	T D GW CE WS PowerPoint	IWB C Handout	C IT WWO PS AN	Quiz Q&A Discussion Group Work	Develop IT skills with the use of MS Excel. Treating all students' submission equally and fairly.

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			Provide assignment 2 feedback.					
25		LA C	**Topic: Statistical methods – Measures of Central Tendency** Presentation on measures of central tendency. Students, working individually, to complete mean, median and mode for both grouped and ungrouped data.	T D GW CE WS PowerPoint	IWB C Handout	C IT WWO PS AN	Quiz Q&A Group Work	Development of research skills Develop IT skills with the use of MS Excel.
26		LA C	**Topic: Statistical methods – Measures of Dispersion** Presentation on measures of dispersion. Students, working individually, to produce range, variance and standard deviation for both grouped and ungrouped data.	T D GW CE WS PowerPoint	IWB C Handout	C IT AN WWO PS	Quiz Q&A Group Work	Development of research skills Develop IT skills with the use of MS Excel.
27		LA C	**Topic: Statistical methods – Cumulative Frequency** Presentation on cumulative frequency. Students, working individually, to produce quartiles, deciles, interquartile range, and percentiles.	T D GW CE WS PowerPoint Assignment Ref	IWB C Handout WS	C IT WWO PS AN IOLP	Quiz Q&A Group Work Assignment Ref Discussion	Development of research skills Develops an understanding of choices and decisions Develop IT skills with the use of MS Excel.

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			Issue Assignment 3. Students are introduced to the assessment process for the assignment, breakdown of the assignment requirement, and revisit learning outcomes and criteria. Discussion of submission requirements for the assignment.					
28-30		LA C	**Topic: Assignment 3 – Independent study & support sessions** Students, working individually, begin to identify resources required for their submission. Students may meet with their tutor, individually or in groups, to discuss their projects and receive advice in support of developing the final outcomes and report. **Resubmit Assignment 3.**	T D GW CE WS PowerPoint	IWB C	C IT WWO PS AN IOLP	Assignment Q&A Discussion Group Work	Development of critical thinking skills Development of drawing and numeracy skills. Develops an understanding of choices and decisions
31		LA C	**Topic: Provide assignment 3 resubmission feedback.**	T D	C IWB	C IT WWO PS	Assignment Ref Discussion	Develops an understanding of choices and decisions

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			Tutor to begin to provide feedback to assignment 2 submissions.			AN		Treat all students' submissions equally and fairly.
32-33		LA C	**Topic: Assignment 3 Resubmission– Independent study & support sessions** Students, working individually, begin to identify resources required for their resubmission. Students may meet with their tutor, individually or in groups, to discuss their feedback on previous submissions and receive advice in support of developing the final assignment report. **Resubmit Assignment 3**	T D GW CE WS PowerPoint	IWB C	C IT PS AN IOLP	Q&A Discussion Assignment	Development of critical thinking skills Development of drawing and numeracy skills. Develops an understanding of choices and decisions
34-35		LA C	**Topic: Provide feedback on assignment 3 resubmissions.** Tutor to provide feedback on assignment 3 resubmissions.	T D	C IWB	C IT WWO PS	Assignment Ref Discussion	Develops an understanding of choices and decisions

Methods of Delivery: T – Talk, D – Discussion, GW – Group Work, RL – Role Play, CE – Class Exercise, WS – Worksheet, etc
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