

STUDENT HANDBOOK
FOR
HIGHER DIPLOMA IN CONSTRUCTION PRODUCTIVITY
MANAGEMENT (HDCPM)



2023 / 2024

Presented by



Faculty of Technology
Wayamba University of Sri Lanka
Kuliyapitiya, Sri Lanka

ABOUT THE FACULTY OF TECHNOLOGY (FOT) OF THE WAYAMBA UNIVERSITY OF SRI LANKA (WUSL)

Faculty of Technology of the Wayamba University of Sri Lanka was established with effect from 21.09.2017. The Faculty is located at Kuliypitya Premises of the University and consists of the following four Departments of Studies.

- Department of Construction Technology
- Department of Electrotechnology
- Department of Mechanical and Manufacturing Technology
- Department of Nano Science Technology

The Faculty conducts the Bachelor of Engineering Technology Honours (BETHons) degree programmes in the following four specialization areas. The curriculums of these degree programmes have been developed to satisfy the requirements specified in the Accreditation Manual of the Sydney Accord and Sri Lanka Quality Assurance Framework (SLQF) Level 6.

- Bachelor of Engineering Technology Honours in Construction Technology (BETHons in Const Tech)
- Bachelor of Engineering Technology Honours in Electrotechnology (BETHons in Electrotech)
- Bachelor of Engineering Technology Honours in Material and Nanoscience Technology (BETHons in Mat & Nano Sc Tech)
- Bachelor of Engineering Technology Honours in Mechanical and Manufacturing Technology (BETHons in Mech & Mfg Tech)

In addition, the Faculty is also currently focusing to introduce external academic programmes for contributing to the developments of industry practices with the direct concept of productivity and performance improvement. These academic programmes were exactly designed by qualified academic experts with the support of industry professionals based on the industry needs. The faculty consists of sufficient resources to deliver these external programmes with the required quality standards. It is expected that these external programmes will also be highly contributing to the faculty development based on the vision and mission of the Faculty.

VISION AND MISSION OF THE FACULTY

Vision

To be the centre of excellence in technology education, innovations, and research and developments through outstanding academic programmes

Mission

To produce highly qualified graduate technologists capable of creating innovative, viable, sustainable and ethical solutions to the real-world technological problems

1. INTRODUCTION OF THE PROGRAMME

PRODUCTIVITY AND PERFORMANCE IMPROVEMENT IN THE CONSTRUCTION INDUSTRY

Construction is one of the most challenging industries in a country. The range of construction projects is wide and divided into various segments usually building construction, road and highway construction, bridge construction, water supply and sewerage, irrigation and drainage canals, etc. Construction involves various resources such as manpower, money, materials, equipment and technologies, and has different phases such as planning, designing, building and maintenance. Improvement in the productivity of the construction industry is considered a significant contribution to the GDP. Productivity correlates with profitability, competitiveness, long-term growth and sustainability of a company, an industry and a nation. Productivity addresses the question of how efficiently resources are used in the production of goods and services. The key to productivity improvement is not to complete as many tasks as possible or to maximize workload, but it is very important to focus on maintaining a predictable workflow. Productivity mainly depends on performance, while performance covers both economic and operational aspects of an industry.

NEED FOR THE PROPOSED PROGRAMME

Infrastructure development of construction plays a key role in the achievement of socio-economic goals in a country, like Sri Lanka. But, many sources highlight the industry's poor practices that result in a lower level of performance and productivity in construction operations in Sri Lanka. The skills and experience of the workers, management, job planning, workers' motivation and material availability are the major drivers of work outputs. The skill shortage is one of the important factors that yield notable impacts on the performance and productivity of construction operations since the quality of trained people coming out from the training institutions is not up to the expectations of the industry. The effectiveness of the construction industry in each country depends on the quality of the workforce, education and training. Sources highlight the unavailability of effective training programmes which address productivity-related problems in the industry. Recent studies and the meetings with the participation of relevant training providers in Sri Lanka confirmed that the training courses that are currently available for the industry practitioners in the country are

having lack of scope for the construction productivity improvement. There is an essential need for effective training programmes that address the productivity improvement concepts and industry's future scopes in different qualification categories of construction industry practitioners.

SIGNIFICANCE OF THIS PROGRAMME

This programme was specifically designed for the construction industry practitioners who can apply better practices on industry operations with the direct scope of the performance and productivity improvement in the construction projects. The curriculum of this programme was developed based on an extensive investigation conducted by the academics of Wayamba University of Sri Lanka and the University of Peradeniya on the performance and productivity of work operations in the Sri Lankan construction projects through research. The developed programme sufficiently addresses the industry's evolving challenges and opportunities, as well as provides a bridge between the institutional and industry practices towards contributing to the development of the country's economy. The significance of this academic programme is the inclusion of independent project studies on performance and productivity improvement practices through the applications of work-based training components within a systematic framework.

NAME OF THE QUALIFICATION

Higher Diploma in Construction Productivity Management (HDCPM)

ABBREVIATION

HDip (Constr Prod Manag)

MEDIUM OF INSTRUCTIONS

English

DURATION

One academic year

[After the completion of 'Diploma in Construction Labour Productivity and Performance Management (DCLPPM)' programme of the Faculty of Technology, Wayamba University of

Sri Lanka or equivalent Diploma qualifications (SLQF Level 3 / NVQ Level 5) from a recognized institution]

TARGET GROUP

Construction supervisory level workers / Construction technical officers / Engineering assistants / Industry practitioners in the construction field

LEVEL OF QUALIFICATION

The level of qualification for the course followers is expected to reach the Sri Lanka Qualification Framework (SLQF) Level 4 which is comparable to the National Qualification Framework (NVQ) Level 6. This qualification is occupational and vocational specific and combines in-depth knowledge in a particular field with practical experience aimed at acquiring the required skills in the workplace. This includes simulated work experience or integrated learning. The Higher Diploma holders will become professionals with problem-solving capacity and process management skills. They will be having highly specialized technical and scholastic skills with complete accountability for determining and achieving personal and/or group outcomes. They will be capable to perform analysis, reformatting and evaluating a wide range of information and broad parameters for defined activities.

2. AIMS AND INTENDED LEARNING OUTCOMES OF THE PROPOSED PROGRAMME

AIM

The proposed programme aims to;

- Prepare the construction industry practitioners to strengthen their work processes, learning demand and job responsibilities dissolving with the scope of improving the performance and productivity of construction operations
- Produce the construction professionals who can perform the reinforcement practices on the industry operations with technical, scholastic and process management skills and problem-solving capacity, leading to applying the advanced tools and resource utilization practices as well as handling the industrial linkages combined with the training and educational practices towards the construction productivity and performance improvement.
- Provide a bridge consisting of efficient roadmaps between the institutional and industry practices for addressing the industry's evolving challenges and opportunities towards contributing to the development of the country's economy

PROGRAMME OUTCOMES

First Year (Diploma in Construction Labour Productivity and Performance Management):

Upon successful completion of the training programme, the participant will be a professional employee who is competent to work independently, take administrative decisions and supervise processes at the middle management level. They will be able to

- Achieve a satisfactory level of proficiency in the English language essential for employability in the construction projects
- Work with the required soft skills at the construction sites with the scope of improving the performance of construction activities
- Solve real problems using mathematical concepts with the scope of improving the performance and productivity levels of construction activities
- Apply fundamental theories of science and technology in the labour operations at the

construction sites with the scope of productivity and performance improvement in the construction activities

- Apply the basic concepts of engineering and technology related theories on the labour operations in the construction sites with the scope of productivity and performance improvement in the construction activities
- Apply effective supervision practices in the building construction works for the productivity and performance improvement in the construction activities
- Apply effective supervision practices in the road/highway construction, bridge construction, irrigation, water supply, drainage and sewerage works for the productivity and performance improvement in the construction activities
- Perform the material and tool handling in the construction activities with the scope of productivity and performance improvement in the construction
- Apply green practices in the construction activities with the scope of productivity and performance improvement in construction
- Apply effective project planning and management practices in the construction activities with the scope of productivity and performance improvement in construction
- Train the labourers in the construction projects through demonstrations, guidelines and other relevant tasks to improve the performance and productivity level
- Apply labour management practices, assess the performance and productivity levels of labour operations in the construction works and report it to the organization

Second Year (Higher Diploma in Construction Productivity and Performance Management):

Upon successful completion of the training programme, the participant will be a professional employee who manages processes at the middle management level with problem solving capacity in construction related practices. They will be able to

- Achieve a satisfactory level of proficiency in the English language essential for performing the business and marketing related needs of the industry matters
- Use the mathematical functions for organizing and structuring the methods in the design and analysis process of technological matters
- Use the statistical functions for organizing and structuring the methods in the design

and analysis process of technological matters

- Use the financial instruments and accounting techniques across the construction management cycle as well as the business and entrepreneurial practices
- Use ICT tools and applications in various construction tasks for improving the productivity and performance of work operations
- Perform the tasks including site selection, site layout planning, architectural designs and drawings, estimation and material selection within the scope of improving productivity and quality of outputs in the various phases of construction
- Perform the water and sanitary engineering related works considering the demands and challenges of increasing water scarcity, flood risks and environmental pollution
- Use the principles of agricultural science and landscape designs in the irrigation works towards the sustainable development
- Analyse the structural elements using the structural theories and design concepts
- Use geotechnical theories for improving the quality and performance of construction operations
- Use the design procedures and maintenance techniques for the sustainable transportation system
- Perform the reinforcement practices on the labour training exercises considering the project directions, purpose, performance of trainers, training contents, delivery methods, feedback of organizational management and follow-up actions towards the construction productivity and performance improvement

3. ADMISSION REQUIREMENTS AND SELECTION PROCEDURES

PREREQUISITES FOR PROSPECTIVE STUDENTS

Successful completion of 'Diploma in Construction Labour Productivity and Performance Management (DCLPPM)' programme of the Faculty of Technology, Wayamba University of Sri Lanka or equivalent Diploma qualifications (SLQF Level 3 / NVQ Level 5) from a recognized institution

APPLICATION AND SELECTION PROCESS

The students who successfully complete the DCLPPM programme with good academic records can be first allowed to follow the HDCPM programme as a direct entry. The applicants who have equivalent Diploma qualifications (SLQF Level 3 / NVQ Level 5) from other recognized institutions will be examined through the application process and selection interviews based on pre-requisite qualifications. The list of selected candidates will be submitted to the Senate through the Board of Study and the Faculty Board of FOT.

COURSE FEE & PAYMENT PLAN

The course fee for HDCPM programme is Rs. 120,000, and the students have to pay Rs. 75,000.00 at the time of registration, and the balance can be made within a period of three months from the course registration during the course. The students may be informed of any changes in the course fee amount and payment procedures approved by the Board of Study. The course fee is not refundable under any circumstances. The right to change the course fee and payment plan shall be vested on the Board of Study.

4. REGISTRATION

On acceptance of the Board of Study / Faculty Board, a person shall forthwith register as a Higher Diploma Student of the University upon payment of prescribed registration and other fees. The minimum period of registration for the Higher Diploma shall be one academic year, and the maximum period shall not exceed two (02) academic years. The period of registration shall be reckoned from the date of commencement of the programme.

5. THE STRUCTURE AND CONTENT OF THE PROGRAMME

PROGRAMME STRUCTURE

Course Code	Course Name	Course Type	No. of Credits
Higher Diploma in Construction Productivity Management (HDCPM) (30 Credits)			
HDCPM 312	Business English for Construction Technologists	Compulsory	2
HDCPM 323	Mathematical Modelling for Technology	Compulsory	3
HDCPM 332	Construction Accounting, Finance and Entrepreneurship	Compulsory	2
HDCPM 343	Design and Technologies in Building Construction	Compulsory	3
HDCPM 353	Water Resources and Environmental Management	Compulsory	3
HDCPM 362	Fundamental Landscaping and Irrigation Technologies	Compulsory	2
HDCPM 412	ICT Tools for Construction Productivity Enhancement	Compulsory	2
HDCPM 423	Statistics for Technology	Compulsory	3
HDCPM 433	Structural Analysis and Design Concepts	Compulsory	3
HDCPM 442	Geotechnical Concepts in Construction	Compulsory	2
HDCPM 452	Transportation & Highway Maintenance for Technologists	Compulsory	2
HDCPM 463	Project Study on Performance and Productivity Enhancement	Compulsory	3

Number Suffix: [Semester][Subject Index in hexadecimal] [No. of Credits]; † indicates both semesters

The detailed curriculum of each course unit is attached in Annexure I.

NUMBER OF CONTACT HOURS

Total number of contact hours will be around 500 in an academic year (excluding project study activities - HDCPM 463).

DELIVERY OF TEACHING AND LEARNING

The delivery of lectures will be conducted by the Faculty of Technology of the Wayamba University of Sri Lanka on weekends. The work-based training and project activities will be carried out by the course followers at their workplaces / selected construction sites through

under the direct guidance of a panel of lecturers. The necessary teaching and learning methods using computer-based tools may also be applied to the delivery of this programme.

6. EVALUATION

The performance of students for each course unit will be evaluated using formative (Tutorials, Quizzes, Practical, Projects and Assignments) and summative examinations (End of semester written examinations). The detailed percentage of marks for assessment methods are included in the detailed curriculum of each course unit. Considering 'Project Study on Performance and Productivity Enhancement (HDCPM 463)', the course followers will be evaluated through progress presentations/reports and final presentations/reports/viva. With the consent of the Board of Study, the percentages assigned to the assessment methods can be altered.

EXAMINATION REGULATIONS

The regulations relating to the examinations in the Wayamba University of Sri Lanka are applicable for HDCPM. Any interpretations of these regulations shall be submitted to the Senate and the decision of the Senate shall be the final.

7. ELIGIBILITY FOR SITTING THE END OF SEMESTER EXAMINATION

The student shall not be permitted to take the semester-end examination unless,

- He/she has been duly registered after paying the prescribed payment as a HDCPM course student from the commencement of the academic semester in which that examination is held.
- He/she has recorded at least 80% of attendance (The excuses are permitted up to a maximum of 20% due to medical/job/other related causes).
- He/she has obtained marks 40% or more in the formative assessment component of the course unit.

REPEAT STUDENT

Any student who earned eligibility for sitting end of semester examination, but failed to reach the normal pass mark at the overall evaluation after the end of semester examination,

will be considered as a 'Repeat Student'. Such a student does not need to face formative assessments again to obtain admission for a subsequent attempt(s), but he/she must re-sit the next end-semester examination. The marks obtained for formative assessment at the proper attempt will be carried forward to be combined with the marks at the end of semester examination(s) of subsequent re-sitting. The highest grade awarded to a student repeating an examination of any course unit will be 'C'. In the event a student obtains a lower grade while attempting to get a better grade, he/she will be entitled to the previous grade. There will be additional fees charged from referred and/or failed students as determined by the Board of Study, Faculty Board and the Senate, depending on the expenses be incurred by the university to serve their repeated attempts in the examination process.

ABSENCE FROM ACADEMIC ACTIVITIES AND EXAMINATION

- No student shall keep away from classes or leave the island or withdraw from the examination or any other aspect of evaluation without the prior approval of the Board of Study.
- Excuses will be granted only if the absence is due to a grave cause such as the student's seriously ill health, or death of a member of the immediate family or any other cause which is accepted by the Board of Study and approved by the Senate. Even though an excuse is granted to a student, he/she can sit for the examination only on the current occasion or next immediate occasion as a proper student.
- If a student fails to attend academic activities or examinations due to a medical reason, such absence should be reported to the Academic Coordinator by a valid medical certificate immediately. All medical certificates should confirm the format of a medical certificate issued by a government hospital and should necessarily be obtained from one of the following medical officers.
 - a. University Medical Officer (UMO)
 - b. District Medical Officer
 - c. Consultant Specialist in the relevant field
 - d. Head of a Government Base Hospital
 - e. Medical Superintendent of a Provincial Ayurvedic Government Hospital
 - f. Ayurvedic Physician registered in the Ayurvedic Medical Council

- The Board of Study will accept medical certificates which are certified by the University Medical Officer. However, if acceptable to the Board of Study, special requests can be considered.
- Under exceptional circumstances, medical certificates issued by private hospitals or registered private practitioners could be considered by the University Medical Officer or the Medical Board.
- When students fall ill during an examination session, such illness should immediately be reported to the University Medical Officer at the University Medical Centre.
- The absence of a student for an examination in the event of the death of an immediate family member will be excused if approval is obtained from the Board of Study and the Senate by submission of the death certificate and appropriate proof of relationship. In that event, the student will receive a symbol of “DFR” (Deferred) for that course.

DEFERMENT FROM ACADEMIC PROGRAMME

When a student is unable to attend the academic programme for a long period by which the students become not eligible to successfully complete the academic works of the semester, then the student may be deferred to the following academic year. Such students are allowed to defer only after initial registration. There must be a genuine reason presented with valid evidence such as a medical certificate and a written request to the course director within a month after the registration. The application fee and course fee are transferable only if the student has not attended a single lecture. Such students are required to pay the registration fee for the new academic year. However, if the course fee of the next batch has been increased, he/she has to pay the balance of the course fee to get registered for the new intake. The selected students are not allowed to transfer their registrations to any other candidates.

8. FINAL GRADES AND MARKS RANGE

Grades will be allocated based on the performance of a student as shown in the following table.

Marks Range	Grade	Description
85 and above	A+	Excellent
80 to 84	A	
75 to 79	A-	
70 to 74	B+	Good
65 to 69	B	
60 to 64	B-	
55 to 59	C+	Pass
50 to 54	C	
45 to 49	C-	Weak Pass
40 to 44	D+	Conditional Pass
35 to 39	D	
0 to 34	E	Fail
	I	Incomplete

- A student who fails to sit at the end of semester examination of a course unit in HDCPM without valid reasons, will receive a grade of 'I'.
- If a student is absent from an examination of a course unit after completing continuous assessments, the following symbol can be indicated appropriately.
 - Absent due to medical reasons, which has been approved, will be given a symbol of 'MC' (Medical).
 - Absent due to valid reasons, which has been approved, will be given a symbol of 'DFR' (Deferred).
- 'Grade D' or above is required to earn credit value for a course unit.
- A student who receives a grade 'E' or grade 'I' for a course unit, and the student is required to sit only for the missed component in the next attempt. The maximum grade given for the course unit is 'C' when the student completes the missed component in the next attempt unless the reason for absence is accepted by the Board of Study.
- The continuous assessment marks shall be carried forward up to a maximum of two consecutive academic years (except the proper attempt) and shall only be replaced with an improvement by reattempting. Improved continuous assessment marks shall be

eligible for the improvement of overall grade of the course unit to the highest possible grade 'C'.

CUMULATIVE CREDIT DEFICIT (CCD)

Cumulative Credit Deficit can be calculated using the following formula for the courses with a grade of 'D', 'D+' or 'C-', where C_i is the number of credits associated with a course in which the student has secured a grade of 'D', 'D+' or 'C-', and d_i is the deficit weightage defined as 1 for a 'D', 2/3 for a 'D+' and 1/2 for a 'C-'.

$$CCD = \sum(C_i * d_i)$$

RELEASING OF THE RESULTS

The university shall display the results of students on the notice board. The result sheet will be issued to each student after releasing the results of each semester by the Examination Branch of the university.

GRADING SCALE

The following grading scale is used to evaluate the overall performance of the student in the Higher Diploma considering the overall average marks obtained.

Overall Average Marks	Grade
75 – 100	Distinction Pass
65 – 74	Merit Pass
55 – 64	Credit Pass
45 – 54	Ordinary Pass
0 – 44	Fail

9. AWARDING OF THE HIGHER DIPLOMA

Higher Diploma in Construction Productivity Management (HDCPM) will be awarded to those who pass his/her course works with 'Project Study on Performance and Productivity Enhancement (HDCPM 463)'. To be eligible to pass the Higher Diploma in Construction Productivity Management, the student:

- i. must complete the required number of credits

- ii. must have at least “C” grade in the course unit ‘Project Study on Performance and Productivity Enhancement (HDCPM 463)’
- iii. must not have a CCD value more than 2 and not having ‘E’ grades
- iv. must obtain Ordinary Pass or above in overall average marks
- v. complete the relevant requirements within two academic years after the registration of HDCPM
- vi. follow all the rules and regulations granted by the Board of Study

RESULTS SHEETS / TRANSCRIPTS

The fees payable for a certificate or statement of results or a transcript shall be determined by the Council of the University.

EFFECTIVE DATE OF COMPLETION

The effective date of Higher Diploma completion shall be the date of the final examination for the Higher Diploma programme.

10. BOARD OF STUDY

The Board of Study (BOS) is the advisory committee which makes recommendations for the improvement and smooth function of the HDCPM programmes in the following aspects. The existing BOS of the DCLPPM programme can be upgraded to HDCPM.

- i. Designing and improvement of the syllabus
- ii. Improving the quality of teaching
- iii. Examinations
- iv. By-laws governing the HDCPM programme with adherence to the university by-laws and policies

The Board of Study (BOS) is consisted with following members:

- a. Dean of the Faculty
- b. Course Director (Chairperson)
- c. Heads of all the Departments in the Faculty
- d. Academic Coordinator
- e. One member from the teaching panel [nominated by the Faculty Board]

- f. A member representing the Senate from another faculty
 - g. Administrative Coordinator
 - h. Financial Coordinator
 - i. Examination Officer
 - j. Two members from the industry / other institutions / authorities
 - k. Other invitees based on the request from the Dean / Course Director
- The Course Director of the programme shall be appointed by the Vice Chancellor, on the recommendation(s) of the Dean of the Faculty.
 - There shall be one (01) Administrative Coordinator, and he/she shall be appointed by the Vice Chancellor on the recommendation of the Course Director. The administrative coordinator shall act as the Secretary of the Board of Study.
 - Academic Coordinator shall be an Academic Staff member of the Faculty of Technology.
 - The Course Director will nominate any other necessary staff members to the Faculty Board. The Faculty Board approved nominations shall be appointed by the Vice Chancellor.
 - The terms for the appointed members above shall be three (03) years.

11. RESOURCE AVAILABILITY

TEACHING PANEL

The Board of Study will decide on obtaining the service of qualified lecturers to conduct the respective courses. The qualified lecturers may be among the permanent academic staff members / academic support staff members from the Faculty of Technology and other faculties/units of WUSL. Qualified industry experts may also be supporting the delivery of the programme.

LABORATORY FACILITIES

- **Materials, Environmental and Geotechnical Laboratory**

Various types of modern equipment such as sieve analysis apparatus, Atterburge limits test apparatus, sand cone test apparatus, compaction testing apparatus, shear box apparatus, triaxial test apparatus, permeability and consolidation testing apparatus, universal tensile

testing machine, concrete cube crushing apparatus, AIV/ACV testing equipment, slump testing apparatus, cube testing machine etc. are available for conducting the practical classes.

- **Surveying and Highway Laboratory**

The Surveying laboratory contains advanced surveying equipment such as total stations, digital levels and GNSS equipment. The laboratory is also equipped with basic surveying instruments such as theodolites and levels to conduct the surveying field works. The highway engineering testing apparatus (Bitumen ductilometer, Marshall testing apparatus, etc.) are also available in the same laboratory.

- **Computer Laboratory**

Computer Laboratories of the Faculty of Technology will be used to conduct relevant practical components of the courses. The facilities available at the Information & Communication Centre (ICT Centre), Kuliypitiya premises will also be utilized in situations where the said is insufficient or in contingencies. The use of LMS is highly encouraged and may also be beneficial to promote open and distance learning facilities to the external students as well as course grading and feedback collection.

In addition, the facilities of the following laboratories/units may also be used to deliver the practical sessions of the HDCPM programme.

- Measurement Laboratory
- Electrical and Electronics Laboratory
- Electrical Machines and Communications Laboratory
- Physics Laboratory
- Manufacturing Laboratory
- Drawing Office
- Workshop Units

LIBRARY FACILITIES

Most of the textbooks required for the references are available at the Main Library of the University Kuliypitiya Premises and will be allowed to be accessed by the students only on a reference basis.

12. IMPLICATIONS OF THE PROGRAMME

The low performance and productivity of construction operations have been seen to be a major factor that contributes to the inefficiency of the construction industry in Sri Lanka. Due to the essential need for the skills development training programme for the industry practitioners, the proposed academic programme has been designed to prepare the construction industry practitioners to strengthen their work processes, learning demands and job responsibilities dissolving with the scope of improving the performance and productivity of construction operations. The outcomes of this academic programme are expected to highly contribute to the construction industry sector for upgrading the current practices with the direct concept of productivity and performance improvement, also to make an effective contribution to the economic and social development of the country through making provision for a nationally consistent, technical and vocational education and training.

The proposed programme shows the roadmaps to direct the industry practices for addressing the industry's evolving challenges and opportunities. The programme includes the application-based learning content and proactive-based methods which are very significant for the industry practitioners to carry out their work tasks with a productive-based approach. It covers a wide range of competencies of construction industry practitioners not only in engineering, technology and mathematics, but also in other disciplines, including management, economics, social sciences, information and communication technology, and other basic sciences. The competency units clearly show the cross-section of the industry's expectations from construction workers for the near-future circumstances and provide the platform to strengthen the productivity and performance improvement scopes in the training components of the construction education sector. This may lead the construction industry practitioners to get new job opportunities, work promotions, salary increments and further career development opportunities in a timely manner, also resulting in a significant improvement in performance, quality and productivity levels of work operations towards the sustainability of the construction industry practices. Overall, the proposed academic programme is expected to make a significant impact on improving the standards of education and training in the country, as well as increasing the industry's long-term focus on reskilling and upskilling for the near-future circumstances of construction practices.

ANNEXURE I

Detailed Curriculum of the Course Units

Course Title	Business English for Construction Technologists	
Course Code	HDCPM 312	
Credits	2	
Course Type	Compulsory	
Pre-Requisites	None	
Hourly Breakdown	Theory	Interactive Session / Assignment
	10	30
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> Achieve a satisfactory level of proficiency in the English language essential for performing the business and marketing related needs of the industry matters 	
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> Communicate verbally in practical business contexts with greater fluency, accuracy and confidence. Express themselves effectively on business-oriented written aspects. Use words and phrases related to business and marketing to express themselves. Develop strategic competence that will help in efficient communication in English. 	
Learning Contents / Topics	<ul style="list-style-type: none"> The Company: Arrival at the company & meeting new colleagues, Finding your way around Elevator pitch: Building a hook, Unique selling point, Call to action Negotiating: Key negotiating language, framing an argument, Negotiating with suppliers, Negotiating with customers Business writing: Letters, E-mails, Notes, Memos, Reports, Leaflets, Tone/ style & standard phrasing Product management: Designing a product, Marketing mix, Product launch Making presentations: Introducing a topic effectively, Linking & sequencing ideas, Concluding, Responding to questions Telephoning: Connecting, Exchanging & clarifying information, Taking & leaving messages, Making arrangements, Listening to different accents, Telephone etiquettes Meetings: Setting the agenda, Chairing, Expressing opinions, Agreeing & disagreeing, Listening & note-taking, Writing minutes 	
Teaching / Learning Activities	Interactive classes may be conducted to practice effective communication. Pair work, group work, regular in class performances, activities based on audio visual resources and demonstrations may be incorporated into teaching and learning sessions.	
Resources	Teaching Aids: Computers, Multimedia, Audio-visual materials, Whiteboard, etc.	

Assessments & Weighting	Type	Assessment Methods / Activities	Weighting
	Formative Assessment	Role-plays, Assignments, In class discussions, Presentation, Report	60%
	Summative Assessment (Semester end)	Question paper based on classroom teaching	40%
Prescribed Texts & / or References	<ol style="list-style-type: none"> 1. Brounstein, M., Bell, A. H., Smith, D.M., & Isbell, C. (2007). <i>Business communication</i>. New Jersey: John Wiley & Sons, Inc. 2. Emmerson, P., & Hamilton, N. (2005). <i>Five-minute activities for business English</i>. Cambridge: Cambridge University Press. 3. Farrall, C., & Lindsley, M. (2008). <i>Professional English in use-Marketing</i>. Cambridge: Cambridge University Press. 4. Schofield, J., & Osborn, A. (2011). <i>Speaking</i>. London: Harper Collins Publishers. 5. Smith, D. G. (2007). <i>English for telephoning</i>. New York: Oxford University Press. 6. Sweeney, S. (2003). <i>English for business communication</i>. Cambridge: Cambridge University Press. 		

Course Title	Mathematical Modelling for Technology		
Course Code	HDCPM 323		
Credits	3		
Course Type	Compulsory		
Pre-Requisites	None		
Hourly Breakdown	Theory	Tutorial / Assignment	
	40	10	
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> Use the mathematical theories for organizing, modelling and structuring the methods in the design and analysis process of technological matters. 		
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> Handle freely the concepts using in mathematical modeling. Analyze a simple real-world phenomena in order to create a mathematical model. Apply numerical methods to solve systems of ordinary differential equations. Interpret numerical results and to predict the behavior of the system. Understand the mechanism of mathematical modeling in construction field. 		
Learning Contents / Topics	<p>An introduction to Mathematical Modelling; Modelling: Difference Equations; Ordinary Differential Equations; Partial Differential Equations; Function Fitting; Model Fitting: Chebyshev Criterion; Least Square Criterion; Linear Regression and data Transformation; Network Models: Graphs and Networks; Network Flows; Assignment Problems; Graph Coloring; Vertex Covers; Local search Algorithm; modelling with Matrices; Modelling with Nonlinear programming: Bisection Algorithm; Newton's Method; Newton's Methods; Steepest Decent; Real world Applications</p>		
Teaching / Learning Activities	Lectures, tutorials and case studies		
Resources	Teaching Aids: Whiteboard, Multimedia, and Computers		
Assessments & Weighting	Type	Assessment Methods / Activities	Weighting
	Formative Assessment	Tutorials and Assignments	30%
	Summative (Semester end) Assessment	Question paper based on classroom teaching	70%
Prescribed Texts & / or References	<ol style="list-style-type: none"> Giordano, Fox, Horton, A First Course in Mathematical Modeling, 5th edition, Cengage, 2013. Lindner, Micheletti and Nunes, Mathematical Modelling in Real Life Problems, 1st ed, Springer, 2020. 		

Course Title	Construction Accounting, Finance and Entrepreneurship		
Course Code	HDCPM 332		
Credits	2		
Course Type	Compulsory		
Pre-Requisites	None		
Hourly Breakdown	Theory	Tutorial / Assignment	
	25	10	
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> Use the financial instruments and accounting techniques across the construction management cycle as well as the business and entrepreneurial practices 		
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> Identify the basic functions of the businesses and the entrepreneurship for the construction field Recognize the tools and techniques for the Financial Accounting Apply Financial Accounting methods and tools for the businesses Manage their own personal finances and understand those of the construction companies. 		
Learning Contents / Topics	<ul style="list-style-type: none"> Business and entrepreneurship for the construction field Introduction to business; Business environment; Management concepts relating to business; Social and ethical issues; Motivations for starting a business Entrepreneur; Theories of entrepreneurship; Characteristics and behavior attributes of entrepreneurs; Entrepreneurship strategies; Competitive Advantage; Identifying entrepreneurial opportunities; Global opportunities; Strategies to capture opportunities Tools and techniques for the financial accounting Bookkeeping (Accounting); Financial analysis; Pro formats and business planning; Cost accounting/control and accounting systems; Project finance 		
Teaching / Learning Activities	Lectures, tutorials and assignments		
Resources	Teaching Aids: Whiteboard, Multimedia, Computers, ICT Tools, etc.		
Assessments & Weighting	Type	Assessment Methods / Activities	Weighting
	Formative Assessment	Tutorials and assignments	30%

	Summative (Semester end) Assessment	Question paper based on classroom teaching	70%
Prescribed Texts & / or References	<ol style="list-style-type: none"> 1. Katz, J. & Green, R.P., 2017. Entrepreneurial Small Business, 5th edition, McGraw-Hill Education 2. Mariotti, S. & Glackin, C., 2015. Entrepreneurship and Small Business Management, 2nd Edition, Pearson Education International. 3. Introduction to Management Accounting, Chapters 1-17/15E (chapter numbers vary) , Charles T. Horngren, Gary L. Sundem, William O. Stratton, Dave Burgstahler, Jeff Schatzberg , Prentice- Hall Edition 4. Robert N. Anthony, Essentials of Accounting (latest edition), Prentice- Hall 		

Course Title	Design and Technologies in Building Construction		
Course Code	HDCPM 343		
Credits	3		
Course Type	Compulsory		
Pre-Requisites	None		
Hourly Breakdown	Theory	Tutorial	Design / Assignment
	30	-	30
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> • Perform the tasks including site selection, site layout planning, architectural designs and drawings, estimation and material selection within the scope of improving productivity and quality of outputs in the various phases of building construction 		
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> 1. Set the design objectives focusing on the quality of outputs for the construction of a building. 2. Designing site layout following productivity improvement concepts in the conceptual design stage of a building. 3. Draw architectural components of buildings using computer-based tools. 4. Apply productive-based approaches in estimating process. 5. Apply quality control practices in selecting construction materials. 6. Perform environmental impact studies for obtaining necessary permits for the construction of a building. 		
Learning Contents / Topics	<ul style="list-style-type: none"> • Construction practices in planning and design stage of a building: Defining project scopes; Setting design objectives; Environmental impact studies • Site layout planning and design: Locating utilities; Overhead power and communication lines; Operations of cranes; Size and location of hoisting equipment; Material quantity, storage and delivery; Tool and equipment storage; Construction operations facilities; Parking facilities; Sanitary facilities; Zoning concepts • Computer-based architectural designs: Designing and drawing elements of a building using architectural software such as AutoCAD, Revit, Sketch-up, etc. • Construction materials and building quality • Estimation and BOQ practices with value engineering concepts 		
Teaching / Learning Activities	Lectures will be delivered to cover the theoretical components of the learning content. In addition, the design classes/sessions may be conducted on site layout design exercises, computer-based architectural designing exercises and estimating exercises with the bill of quantity practices.		
Resources	Teaching Aids: Computers, Multimedia, Whiteboard, Laboratory Resources and Facilities, ICT Tools, etc.		

Assessments & Weighting	Type	Assessment Methods / Activities	Weighting
	Formative Assessment	Design / Assignment	40%
	Summative (Semester end) Assessment	Question paper based on classroom teaching	60%
Prescribed Texts & / or References	<ol style="list-style-type: none"> 1. Roy Chudley and Roger Greeno (2014). Building Construction Handbook, 10th Edition, Routledge, Taylor and Francis Group, London and New York. 2. Rangwala (2004). Building Construction, Charotar Publishing House. 3. S.K. Sharma and B.K. Kaul (1987). A Text Book of Building Construction, S. Chand & Company, 6th Edition. 4. B.N. Dhatta (2007). Estimating and Costing in Civil Engineering, UBS Publishers. 5. T. Jeyapoovam (2005). Engineering Drawing & Graphics using AutoCAD, Vikas Publishing House. 		

Course Title	Water Resources and Environmental Management		
Course Code	HDCPM 353		
Credits	3		
Course Type	Compulsory		
Pre-Requisites	None		
Hourly Breakdown	Theory	Tutorial	Design / Assignment
	30	5	25
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> • Perform the water and sanitary engineering related works considering the demands and challenges of increasing water scarcity, flood risks and environmental pollution 		
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> 1. Apply the relevant theories and concepts related to the water balance components precipitation, evapotranspiration and runoff 2. Apply the relevant theories and concepts related to the physical processes and phenomena that are relevant for surface and subsurface flow 3. Apply the concepts of integrative and sustainable approaches in water resources management 4. Apply the relevant theories related to the mechanical and biological wastewater and sludge treatment systems and find out save and economic technologies in municipal water management 		
Learning Contents / Topics	<ul style="list-style-type: none"> • Hydrological and Environmental Cycles • Climate change and Water Resources • Introduction to Modelling for Water Resources and Environment • In-situ Measurements for Water Resources Monitoring and Management • Water quality assessment • Water quality legislations in Sri Lanka • Wastewater treatment and landfills 		
Teaching / Learning Activities	Lectures, designs, tutorials and assignments will be delivered to cover the contents.		
Resources	Teaching Aids: Computers, Multimedia, Whiteboard, Laboratory Resources and Facilities, ICT Tools, etc.		
Assessments & Weighting	Type	Assessment Methods / Activities	Weighting
	Formative Assessment	Tutorials, Laboratory practical, Field work assignments	40%
	Summative (Semester end) Assessment	Question paper based on classroom teaching	60%
Prescribed Texts & / or References	1. Chow, V., Maidment, D., & Mays, L. (2013). <i>Applied hydrology</i> . McGraw-Hill Professional.		

	<ol style="list-style-type: none">2. Mutreja, K. (1995). <i>Applied hydrology</i>. Tata McGraw-Hill.3. Hammer, M., & Hammer, M. (2015). <i>Water and wastewater technology</i>.4. Wong, J. (2016). <i>Sustainable solid waste management</i>. American Society of Civil Engineers.
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Course Title	Fundamental Landscaping and Irrigation Technologies		
Course Code	HDCPM 362		
Credits	2		
Course Type	Compulsory		
Pre-Requisites	None		
Hourly Breakdown	Theory	Tutorials/ Field Demonstrations	Assignments/Field Visit
	20	10	10
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> Understand the fundamental principles of irrigation and landscaping technologies, as well as to use the principles of agricultural irrigation and landscape designing to ensure sustainability in construction projects 		
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> Describe the potential functions of landscaping and the evolution of landscape design styles and modern practices Explain the fundamental principles of landscape technology Explain the basic principles related to water & irrigation management Describe and utilize landscape designs, different irrigation methods and systems in construction projects 		
Learning Contents / Topics	Introduction to functions and evolution of landscaping; Landscape design styles and modern practices; Elements and principles of landscape designs; Introduction to water resource management; Different types of water resources and their potential applications, Fundamental principles of water & irrigation management, Assessment of crop water requirements and irrigation scheduling, Basic components of irrigation systems, Irrigation methods and systems (Conventional and Advanced)		
Teaching / Learning Activities	Lectures, tutorials, field demonstrations and field visits		
Resources	Teaching Aids: Computers, Multimedia, Whiteboard, Laboratory Resources and Facilities (Irrigation components and systems), ICT Tools, etc.		
Assessments & Weighting	Type	Assessment Methods / Activities	Weighting
	Formative Assessment	Tutorials and Field reports	30%
	Summative (Semester end) Assessment	Question paper based on classroom teaching	70%
Prescribed Texts & / or References	1. Marc Treib (2008), Representing Landscape Architecture, 1st Edition, Taylor & Francis Group		

	<ol style="list-style-type: none">2. The Great Gardening Academy (2022), Learn to Landscape: An 8 Step System that Every Home3. Herman J. Finkel (1982). Handbook of Irrigation Technology: Volume 2, Taylor & Francis Group4. Eisenhauer, D. E., Martin, D. L, Heeren, D. M. & Hoffman, G. J. (2021). Irrigation Systems Management, ASABE. doi:10.13031/ISM.2021
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Course Title	ICT Tools for Construction Productivity Enhancement	
Course Code	HDCPM 412	
Credits	2	
Course Type	Compulsory	
Pre-Requisites	None	
Hourly Breakdown	Theory	Tutorial / Assignment
	25	10
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> • Use ICT tools and applications in various construction tasks for improving the productivity and performance of work operations 	
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> 1. demonstrate the understanding of hardware & software performance analysis 2. design intuitive graphic designs for proper communication 3. use online collaboration, and documentation to group assignment 	
Learning Contents / Topics	<p>Computer Hardware and Software Different types of computer hardware, Software types and categories, Performance analysis of PC/Laptops, Basic Troubleshooting, selecting proper PC/Laptop based on right requirements.</p> <p>Online Documentations Use of online/offline office software packages for effective documentation. E-signature and their legal background, PDF editing</p> <p>Online Collaboration Tools Use of online cloud-based applications and storage system to collaborate on single project as a team. Online meeting setup and conferencing</p> <p>Introduction to Project Management Tools Introduction to Project Management concepts, Project Management & Task Management tools</p> <p>Use of Communication Tools & Ethics Introduction to business communication platforms. Effective communication & collaboration techniques. Communication etiquette</p> <p>Tools for improving Writing and Designing Introduction to basics of graphic designing, difference of raster and vector graphics, color psychology, typography, use of graphic designing to better visualization. Plagiarism Checking, Grammar and English writing enhancement tools</p>	
Teaching / Learning Activities	Lectures, tutorials and practical sessions can be delivered to cover the contents.	
Resources	Teaching Aids: Computers, Multimedia, Whiteboard, Laboratory Resources and Facilities, ICT Tools, etc.	

Assessments & Weighting	Type	Assessment Methods / Activities	Weighting
	Formative Assessment	Tutorials, Laboratory practical, Group assignments	40%
	Summative (Semester end) Assessment	Question paper based on classroom teaching	60%
Prescribed Texts & / or References	<ol style="list-style-type: none"> 1. Computer Science for Advanced Level, Ray Bradley, Stanley Thomas Publishers Ltd (Latest Version) 2. Troubleshooting Your PC For Dummies, Dan Gookin, For Dummies 		

Course Title	Statistics for Technology		
Course Code	HDCPM 423		
Credits	3		
Course Type	Compulsory		
Pre-Requisites	None		
Hourly Breakdown	Theory	Practical	Tutorial / Assignment
	35	10	10
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> Use the statistical functions for organizing and structuring the methods in the design and analysis process of technological matters 		
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> Explain the basic concepts underlying probability and statistics, Explain the underlying assumptions and the applicability of each of the approaches studied, Demonstrate the importance of Statistics in making decisions on day-to-day life problems, Apply statistical models and statistical concepts to solve real-life problems. 		
Learning Contents / Topics	<p>Introduction: Rationale for learning Statistics, How the Statistics serves the scientists, Basic terminology, Essence of Science, Types of measurement and Statistical approach. Descriptive Statistics: Techniques of data presentation, Measures of Central Tendency, Measures of Dispersion and Shapes of distributions. Probability: Algebra of sets, Permutations and Combinations, Random or non-deterministic experiment, Sample space, Events and event space, Classical, frequency and axiomatic definitions of probability, Conditional probability, Partition of a sample space, Total probability and Bayes' Theorem. Probability Models: Bernoulli, Binomial, Poisson and Normal models. Fitting a theoretical distribution to set of observed values: Binomial, Poisson and Normal distributions. Sampling and sampling distributions: Random sampling, Stratified sampling, Sampling error, Sampling distributions and Degrees of freedom. Confidence intervals for means: one sample, two samples, paired samples. Hypothesis testing: type I error, type II error, tests for means: one sample, two samples, paired samples. Analysis of variance: one-way analysis of variance, two-way analysis of variance. Correlation and regression: scatter diagrams, Pearson's correlation coefficient, regression model fitting, goodness of fit, residual analysis</p>		
Teaching / Learning Activities	A combination of lectures, practical sessions using a statistical package, tutorials, group work and assignments.		
Resources	Teaching Aids:		

	Multimedia, Whiteboard, Computer Laboratory Resources and Facilities, Statistical Package, ICT Tools, etc.		
Assessments & Weighting	Type	Assessment Methods / Activities	Weighting
	Continuous Assessment	Tutorials, assignments, practical and class test	30%
	Final Assessment (Semester end)	Question paper based on classroom teaching	70%
Prescribed Texts & / or References	<ol style="list-style-type: none"> 1. Richard, P.R., Andrey, H., David, J.P. and Kay, C., (2002), <i>Fundamentals of Behavioural Sciences</i> (8th ed.), McGraw-Hill. 2. Ross, S.M., (2014), <i>Introduction to Probability and Statistics for Engineers and Scientists</i> (5th ed.), Harcourt Academic Press. 		

Course Title	Structural Analysis and Design Concepts	
Course Code	HDCPM 433	
Credits	3	
Course Type	Compulsory	
Pre-Requisites	None	
Hourly Breakdown	Theory	Tutorial / Design / Assignment
	40	10
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> Analyse the structural elements using the structural theories and design concepts 	
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> Apply structural concepts for analysing the internal forces, moments, stresses and other actions in structural elements under static conditions. Apply the structural concepts in assessing the internal actions of structural elements under dynamic conditions. Apply classical methods in calculating the deflections in statically determinate structural elements. Calculate the deflections of statically indeterminate structural elements. Assess the stresses in unique and composite sections. 	
Learning Contents / Topics	<ul style="list-style-type: none"> Analysis of structural elements under static conditions: Analysis of truss members; Shear force and bending moment distributions in Beams; Bending stress and shear stress distributions in beams; Deflection profile of beams, Qualitative analysis of beams; Axial, shear and bending moment distribution in frames, Analysis of cables and arches Analysis of structural elements under dynamic conditions: Drawing influence lines for beams and trusses under dynamic loads Deflections in statically determinate structural elements: Virtual work methods in calculating displacements of truss elements; Classical methods (Virtual work methods, Mccaullay's equation methods, Castigliano's theorem, etc.) for calculating deflections of beams Analysis of statically indeterminate structures: Slope deflection methods; Moment distribution method Shear and bending stress distribution in unique and composite sections 	
Teaching / Learning Activities	Lectures will be delivered to cover the theoretical components of the learning content. In addition, the design and tutorial discussion sessions will be conducted focusing on the learning outcomes.	
Resources	Teaching Aids: Computers, Multimedia, Whiteboard, ICT tools, etc.	

Assessments & Weighting	Type	Assessment Methods / Activities	Weighting
	Formative Assessment	Tutorials, quizzes and design assignments	30%
	Summative (Semester end) Assessment	Question paper based on classroom teaching	70%
Prescribed Texts & / or References	<ol style="list-style-type: none"> 1. Russell C. Hibbeler (2016). Engineering Mechanics: Statics & Dynamics, 14th Edition, Pearson Publishers. 2. Bhavikatti S.S. (2006). Structural Analysis Vol I, Vikas Publishing House. 3. Arthur. P. Boresi & Richard J.S. (2004). Engineering Mechanics, Statics and Dynamics, Thomsonsbrookswle. 4. Nautiyal B.D. (2001). Introduction to Structural Analysis, New Age International. 5. Reddy (2001). Basic Structure Analysis, Tata McGraw-Hill Education. 6. Sreenivasulu N. (2000). Strength of Materials and Theory of Structures, Radient Publishing House. 7. Irving H. Shames (1996). Engineering Mechanics, Prentice-Hall. 		

Course Title	Geotechnical Concepts in Construction		
Course Code	HDCPM 442		
Credits	2		
Course Type	Compulsory		
Pre-Requisites	None		
Hourly Breakdown	Theory	Tutorial / Assignment	
	40	10	
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> • Use geotechnical theories for improving the quality and performance of construction operations 		
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> 1. Plan the subsurface exploration program 2. Identify types of soil/rock explored during the subsurface exploration program 3. Identify possible geotechnical- related failures can happen 4. Ensure the constructions works are carried out in order to overcome geotechnical- related failures 		
Learning Contents / Topics	<p>Purpose and benefits of site investigation, Methods of sub surface Exploration, Selection of a suitable subsurface exploration method/methods, Soil/Rock Sampling and Soil/rock Samplers, Field Tests, Bore hole logging and Borehole Logs, Site Investigation Report, Types and selection of shallow and pile foundations, Settlement of foundations, differential settlement, Pile groups, Construction of shallow and pile foundations, Testing of piles, Externally and internally stabilized earth retention systems, Slope failures</p>		
Teaching / Learning Activities	Lectures and tutorials will be delivered to cover the contents.		
Resources	Teaching Aids: Computers, Multimedia, Whiteboard, Laboratory Resources and Facilities, ICT Tools, etc.		
Assessments & Weighting	Type	Assessment Methods / Activities	Weighting
	Formative Assessment	Tutorials and assignments	40%
	Summative (Semester end) Assessment	Question paper based on classroom teaching	60%
Prescribed Texts & / or References	<ol style="list-style-type: none"> 1. Principles of Geotechnical Engineering, 7th Edition, Braja M.Das 2. Smith's Elements of Soil Mechanics, 9th Edition, Ian Smith 3. Craig's Soil Mechanics, 8th Edition, J. A. Knappett and R. F. Craig 		

Course Title	Transportation & Highway Maintenance for Technologists	
Course Code	HDCPM 452	
Credits	3	
Course Type	Compulsory	
Pre-Requisites	None	
Hourly Breakdown	Theory	Tutorial / Assignment
	25	10
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> • Use the design procedures and maintenance techniques for the sustainable transportation system 	
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> 1. Select suitable materials for subgrade, subbase and base construction 2. Identify suitable road construction methodology for a given design and site conditions 3. Demonstrate an understanding of pavement management, surfacing and repair methods 4. Examine a road construction environment and review the road construction methods 	
Learning Contents / Topics	<p>Pavement structure Function of subgrade, subbase, base and surface layer</p> <p>Pavement materials – Soil and Aggregate Material selection for pavement layers, compaction of soil layers, quality control and assurance tests for soil, gravel and aggregate layers</p> <p>Road construction Asphalt surfacing – production, transportation, laying and compaction of asphalt concrete, concrete pavement construction, low cost construction methods, tests for quality assurance of construction</p> <p>Highway maintenance Pavement distresses, periodic and routine maintenance of roads - single and multiple surface dressing for periodic maintenance, sand seals, fog seals, and slurry seals, pothole repair and sealing cracks, maintenance of road markings and road signs, asphalt concrete overlay, maintenance of structures, highway workzones</p> <p>Pavement and safety management Principals of pavement management, optimization approaches in pavement management, road condition evaluation – structural and functional, best practices of road safety management</p>	

Teaching / Learning Activities	Lectures, tutorials and practical sessions may be delivered to cover the contents. Practical sessions may be conducted on surveying field work, bitumen testing experiments.		
Resources	Teaching Aids: Computers, Multimedia, Whiteboard, Laboratory Resources and Facilities (Bitumen Testing Instruments, ICT Tools, etc.)		
Assessments & Weighting	Type	Assessment Methods / Activities	Weighting
	Formative Assessment	Tutorials, Laboratory practical, Field work assignments	40%
	Summative (Semester end) Assessment	Question paper based on classroom teaching (End semester examination)	60%
Prescribed Texts & / or References	<ol style="list-style-type: none"> 1. Wright, P. H. and Dixon, K. (2003). Highway Engineering (7th ed.). John Wiley & Sons, Inc. 2. Highways: the location, design, construction and maintenance of road pavements / edited by C.A. O'Flaherty; contributing authors, A. Boyle ... [et al.], 4th ed., Oxford., Butterworth-Heinemann 3. Pavement engineering: principles and practice / Rajib B. Mallick and Tahar, 2nd ed., Boca Raton, Taylor & Francis 		

Course Title	Project Study on Performance and Productivity Enhancement	
Course Code	HDCPM 463	
Credits	3	
Course Type	Compulsory	
Pre-Requisites	None	
Duration	6 Months of Project Work	
Module Aim/s	<p>To enable the students to:</p> <ul style="list-style-type: none"> • Perform the reinforcement practices on labour training project exercises considering the project directions, purpose, performance of trainers, training contents, delivery methods, feedback of organisational management and follow-up actions towards the construction productivity and performance improvement. 	
Learning Outcomes	<p>At the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> 1. Assess the direction of the labour training tasks with the training purposes at construction sites. 2. Assess the performance of labour trainers with the direction of training delivery at construction sites. 3. Assess the training contents and delivery methods with the training aims at construction sites. 4. Evaluate the training outcomes with a focus on the changes in performance and productivity levels of construction operations. 5. Evaluate the feedback of the organizational management on the training delivery and training outcomes. 	
Learning Contents / Topics	<p>A supervised and guided work will be carried out to apply reinforcement practices to labour training project exercises towards the achievement of the above learning outcomes.</p> <p>Lectures, group discussions, project visits and progress review meetings will be conducted throughout this project study.</p>	
Teaching / Learning Activities		
Resources		
Assessments & Weighting	Assessment Methods / Activities	Weighting
	<p>Monthly Progress Report / Presentations – 50%</p> <p>Final Report – 30%</p> <p>Final Presentation & Viva – 20%</p>	100%
Prescribed Texts & / or References	<ol style="list-style-type: none"> 1. Cole A.G. (2000). Management-Theory and Practice, 5th edition, DP Publication Ltd., London 2. Thomas H. R. and Ellis R. D. (2017). Construction Site Management and Labor Productivity Improvement. 3. Training of Trainers Project on Labour Training Exercises for Diploma in Construction Productivity and Performance Management – Guide Book, Wayamba University of Sri Lanka. 4. Any other relevant reading materials 	

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