

CVNG 3015

SIP Projects

September 2011

Course Coordinator: Dr. Rupert Williams

No.	Project Title	Brief Description	Name: Professor/Lecturer
1	Probabilistic Design of a Rainwater Harvesting Tank	Optimal sizing of a rainwater harvesting tank requires consideration of uncertainty associated with rainfall. This SIP attempts to address this issue through the application of a transition probability matrix derived from a record of monthly rainfall data for an estimated temporal demand.	G. Shrivastava
2	A simple numerical model for delineating water well protection zone	Preservation of groundwater quality is essential for public health. This SIP aims to build a simple numerical model, based on advection and assumptions of potential flow, to delineate a protection zone around a given water well, where land use practices can be controlled to maintain water quality.	G. Shrivastava
3	Water, Environment and Food Security: A Case Study in the Commonwealth Caribbean	Water, Environment and Food Security is a critical issue in many parts of the Commonwealth Caribbean. Yet, there is an absence of quantitative study of the same. The objective of this SIP, for a Commonwealth Caribbean Country, is to study the factors underlying water, environment and food security in a quantitative as well as critical manner.	G. Shrivastava

4	A hydrodynamic study of a potential tsunami along the East Coast of Trinidad	The tsunami events in the Indian Ocean in 2004 and in the Northern Pacific Ocean in 2011 bring to mind the potential of similar events occurring in the mid Atlantic Ocean off the East Coast of Trinidad. Further, the potential socio-economic damage is likely to be considerable; given the fact that significant population centres as well as industrial installations are located along the said coast. The objectives of this SIP are: (a) to assess the magnitude and probability of a potential tsunami threat, (b) propose guidelines for the design of tsunami shelters for ensuring hydrodynamic and structural stability of the same during tsunami /structure interaction.	G. Shrivastava
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No.	Project Title	Brief Description	Name: Professor/Lecturer
5	Beach Morphology Statistics	The student will be expected to run a coastal morphology numerical model and extract shoreline positions, based on a reference datum. The students will be expected to statistically analyze these results and compare to published data.	D. Lamb
6	Swash Zone Analysis	Using a field data set, the student will be expected to analyze this data and apply to an empirical model to deduce the swash zone hydrodynamics. Maximum run up values will be the ideal output from this analysis.	D. Lamb
7	Modelled Shoreline Assessment	The student will use a coastal morphology numerical model and determine the impact of changing the values of key variables or coefficients. An assessment of the impact of these variables in the model prediction is the desired output.	D. Lamb
8	Quantitative Vulnerability for Coastal Erosion	The student will assess current techniques that can be used to assign a quantitative value of vulnerability to coastal erosion. This vulnerability review will lead to a means to assess at risk assets prone to coastal erosion.	D. Lamb

No.	Project Title	Brief Description	Name: Professor/Lecturer
9	Willingness to pay for improved water services in South Trinidad	This study requires the development of a survey tool that can assess householders' willingness to pay for improved water services.	E. Peters
10	Willingness to pay for improved water services in East Trinidad	This study requires the development of a survey tool that can assess householders' willingness to pay for improved water services.	E. Peters
11	Measuring the performance of the treatment plant at the St. John's Road Hall of Residence	In 2011 one student began investigating the performance of the UWI St. John's Road WWTP. This project is a continuation	E. Peters
12	Investigating the potential of a green economy in Tobago	In 2008 UNDP launched its Green Economy Initiative. Further the UN General Council has identified green economy as one of the two major issues for discussion at the Rio plus 20 meeting in 2012. All the Caricom countries would be in attendance. One of the pillars of this green economy is water and wastewater management. This project would allow the student to investigate how ready TT is to implement a green economy particularly as it relates to water and wastewater management	E. Peters

No	Project Title	Description	Name: Professor/Lecturer
13	Compaction of Hot Mix Asphalt	This project involves a comparison of the strength properties of Hot Mix Asphalt samples prepared by two different methods of compaction, gyratory compaction and Marshall compaction. Both static and dynamic strength properties may be employed, and their respective impact on flexible pavement design evaluated.	R. Charles 2*
14	Temperature susceptibility of Hot Asphalt Mixes	Increasing ambient temperatures can lead to accelerated deformation of asphalt surfacings. This project aims to define a suitable asphalt binder consistency for Hot Mix Asphalt to withstand higher than normal ambient temperatures in T&T. Testing may include permanent deformation and dynamic creep testing of asphalt mixes.	R Charles 2
15	Morphology of Volcanic Aggregate	This project aims at investigating the morphology of volcanic aggregates found in the Island of St. Lucia, and to establish the uniqueness of these aggregates relative to igneous and sedimentary rock aggregates. Aggregate imaging techniques, as well as petrographic evaluation will be employed.	R Charles 3
16	Use of Reclaimed Asphalt Pavement in Road Bases	Reclaimed asphalt surfacing material (RAPs) have some salvage value to which more value may be added, and the resulting material employed in the structural layers of the road pavement. This project seeks to identify innovative ways of employing improved or stabilised RAPs in the bases and/or surfacings of heavy duty pavements. It will involve CBR and compressive resistance testing, along with elastic layered analysis of associated pavement structure configurations.	R Charles 2
17	The use of Pedestrian Transport on the UWI St. Augustine Campus (Project Assigned # 808000453).	Increased demand for roadway capacity, vehicle parking, and pedestrian movements on the UWI St. Augustine Campus is leading to overall congestion and conflict. One of the measures is to increase the mobility of persons is through the use of bicycles on Campus. This project investigates the suitability of this measure and seeks to establish its impact on overall mobility of persons on the Campus	R. Charles L. Williams (NIDCO) 3

18	The Efficiency of the East West Corridor Highway Interchange Scheme	The Interchange Scheme on the Churchill Roosevelt Highway was implemented to reduce travel times and improve the overall level of service of the highway segment between Barataria and Valsayn. This project aims to investigate the current traffic characteristics, compare them with the previous situation of 3 years ago, and establish the current trend of benefits to road users.	R. Charles L. Williams (NIDCO) 2

- Level of difficulty (1 highest, 4 lowest)

No	Project Title	Description	Name: Professor/Lecturer
19	AASHTO load distribution factors for bridge design		I. Khan Kernahan
20	Design of box culverts		I. Khan Kernahan
21	Approximate methods in the seismic design of multi-storey frames		I. Khan Kernahan
22	The stability of retaining walls		I. Khan Kernahan

No.	Project Title	Brief Description	Name: Professor/Lecturer
23	Assess the cost of erosion in the Northern Range Catchments	Government spends 100's of millions of dollars removing sediments from drains and rivers to permit free flow of flood waters. There is a need to quantify the unit cost per volume of sediment removed from water ways and the volume of sediment from various sources. The cost of sediment removal includes: desilting and erosion prevention works. St. Ann's River Catchment main River.	P. Narinesingh
24	Same	(St. Ann's River Catchment) Forested areas	P. Narinesingh
25	Same	(St. Ann's River Catchment) Approved Development	P. Narinesingh
26	Same	(St. Ann's River Catchment) Areas of Squatting	P. Narinesingh

No	Project Title	Brief Description	Name: Professor/ Lecturer
27	Applications of geotextiles for erosion control		A . Mwasha
28	Investigation on the use of shredded waste PET bottles as aggregate in lightweight concrete	In this work, the utilization of shredded waste Poly-ethylene Terephthalate (PET) bottle granules as a lightweight aggregate in mortar is to be investigated. Investigation should be carried out on two groups of mortar samples, one made with only PET aggregates and, second made with PET and sand aggregates together. TCL cement should be used. The water-binder (w/b) ratio and PET-binder (PET/b) ratio used in the mixtures were 0.45 and 0.50, respectively. The size of shredded PET granules used in the preparation of mortar mixtures should vary from .1 and 4 mm. The outcome of this research is to find out that	A . Mwasha

		mortar containing only PET aggregate, mortar containing PET and sand aggregate, and mortars can be used as structural lightweight concrete category in terms of unit weight and strength properties.	
29	Disposal and applications of polystyrene wastes as construction materials		A . Mwasha
30	Assessment of building envelopes in terms of sustainability		A . Mwasha
31	Adaptive thermal comfort and sustainable thermal standards for the UWI st Augustine lecture halls		A . Mwasha

No.	Title	Description	Name: Professor/ Lecturer
32	Decision Tool for Engineering Contract Problems	<p>Making decision in engineering works is often taken for granted. The outcome however can leave significant impact on projects, through savings or the loss of revenue. Selecting the most appropriate contract for use on a project is an important decision that requires numerous inputs from various sources. This project utilises MATLAB as a tool to make decisions between which of two engineering contracts (FIDIC Red book and FIDIC yellow book) can be selected for use on building and road projects.</p> <p>(MATLAB computer package)</p>	H. Martin
33	A Case Study addressing the suitability of procurement decision models for building construction projects.	Procurement strategies include (Design Build, Traditional, Management system etc). This research review the existing models used in procurement decisions to determine their applicability to building construction projects in Trinidad.	H. Martin
34	Learning styles, Class Attendance and Course Output standards. A comparative study of Fluid, soils, and structural	<p>Learning style is an individual's unique approach to learning based on strengths, weaknesses, and preferences; and is a reflection of the manner in which an individual processes information. It is often speculated that if you do not attend classes you will not do well. This research will partly test this statement by carrying out an assessment of students in three key areas (Fluid Mechanics, structures, and Soil Mechanics) of a civil engineers training. The assessment will look at teaching styles of lectures, learning styles of students, class attendance, and final course marks.</p> <p>(SPSS computer package)</p>	H. Martin

35	The effect of aggregate proportion, and age of concrete on Schmidt Hammer compressive strength predictions	<p>The strength of concrete can be tested in a wide variety of ways, some destructive and some non-destructive. It is economically useful and safe to determine the strength of concrete and need for possible repair of the many existing concrete structures without damaging them. Quite often, for example when testing the condition of a beam in an existing building, destruction of the member is not an option. The strength developed in a particular beam can also be determined prior to removing the formwork. There are several factors which point to the usefulness of non-destructive testing, including but not limited to:</p> <ol style="list-style-type: none">1. To reduce the time between testing and availability of data2. To reduce the work of sampling (either extracting samples of the finished product or making samples)3. To obtain more accurate data from the structure itself and not from samples which can be slightly misleading in absolute test values4. To assess the “residual strength” of structures after damage due to fire, overloading etc.5. To estimate the actual in place strength of concrete before removing formwork and/ or de-tensioning a pre-stressing strand. (Fuentes 1993) <p>This research is aimed at determining how aggregate content and age of concrete influences the accuracy of Schmidt hammer strength predictions.</p>	H. Martin
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No	Title	Brief Description	Name: Professor/ Lecturer
36	Rainfall-runoff analysis of the Acono River Catchment	The student will develop the hydrographs generated by the Acono River Catchment in response to rainfall inputs, using recently collected hydrologic data.	V. Cooper
37	Rainfall-runoff analysis of the Acono River Catchment	Same as #36	V. Cooper
38	Estimation of the BOD decay constant for use in water quality modeling of wastewater treatment effluents.	The student will collect wastewater samples from several wastewater treatment plants and perform laboratory experiments to determine the BOD rate constant needed for evaluation of the impacts of wastewater on rivers.	V. Cooper
39	Examination of the relation between grain-size distribution of soils and hydraulic conductivity.	The student will analyze recently collected data on infiltration rates and grain-size distributions from soil samples taken from a nearby catchment.	V. Cooper

No	Title	Brief Description	Name: Professor/ Lecturer
40	The Effect of Wall Length on the Accuracy of Equivalent- Frame Analysis of Perforated RC Shear Walls	The use of RC shear walls for seismic resistance is increasing in the Caribbean yet common analysis approaches can give erroneous results. Analytical Investigation.	R. Clarke
41	The Monotonic Lateral Load Behavior of a Ferrocement Wall Element for Caribbean Application	Low cost, sustainable, multi-hazard housing solutions are required for the Caribbean. Lab Investigation.	R. Clarke
42	The 795 Cyclic Lateral Load Behavior of a Modified Confined Masonry Wall for Caribbean Application	Though confined masonry is technically viable, block typically used are much thicker than the type of blocks used regionally. Lab Investigation.	R. Clarke
43	The 795 Cyclic Lateral Load Behavior of a Ferrocement Wall Element for Caribbean Application	Low cost, sustainable, multi-hazard housing solutions are required for the Caribbean. Lab Investigation.	R. Clarke

No	Title	Brief Description	Name: Professor/ Lecturer
44	Investigation of the Shear Strength characteristics/parameters of Trinidad Clays (B+ or better Soil Mechanics) (Project Already Assigned to student # 809001499).		D. Gay
45	Investigation of the Volume change characteristics/parameters of Trinidad Clays.		D. Gay

	(B+ or better Soil Mechanics)		
46	Investigation of The Ceramic Potential of Trinidad Clays. (B+ or better Soil Mechanics, CXC/CAPE Art)		D. Gay
47	Numerical Investigation of the sediment load/deposition potential of the Caroni, St Ann's, Maraval and Diego Martin Rivers on the POS coastal environment. (B+ or better Fluid Mechanics)		D. Gay

No.	Title	Brief Description	Name: Professor/ Lecturer
48	Design of Timber Buildings for Improved Hurricane Resistance in the Caribbean	<p>Timber is used extensively for low-rise buildings throughout the Caribbean region. Every year many of these structures are exposed serious damage due to hurricanes and other tropical storms. The lack of engineering design and poor construction techniques have been identified as major factors contributing to the poor performance of wooden buildings when subjected to hurricane forces.</p> <p>The project would consider the design principles for low rise timber-frame buildings to provide improved performance when subjected to hurricane forces the Caribbean region</p>	W. Wilson
49	LRFD Design of Timber Bridges	Timber beams are use in many parts of the world for highway bridges, rural and forest/logging bridges. These are designed in	W. Wilson

		<p>using various structural forms including solid timber, glulam, stress-laminated and composite bridge systems (concrete-timber, steel-timber).</p> <p>The project will involve the following aspects:</p> <p>Theoretical work using Excel spreadsheets</p>	
50	LRFD Design of Timber Industrial Buildings	<p>Timber is used in the construction of various types of buildings including residential, commercial, industrial, institutional and recreational in many parts of the developed world. These structures are designed mainly using glulam members; however, many are designed using solid timber. Various structural forms are used for industrial timber structures including, portal frames, trusses, post-and-beam, pitched-cambered beams, etc.</p>	W. Wilson

No	Title	Brief Description	Name: Professor/ Lecturer
51	Fire Resistance Applications and Methods for Structural Steel Buildings.	This research is aimed at the methods which are used for the determination of the Fire rating of buildings and current methods which are used for enhancing the fire resistant capabilities of buildings.	R. Williams
52	Effect of weld Access cuts in complete joint Penetration welds of Wide Flange Beam Sections.	This research looks at the strength reduction in members for which CJP welds are used. And are required to have Weld access cuts.	R. Williams
53	The effect of OSHA Erection Rules on Fabricators and Contractors.	General History of the OSHA Regulations and how it impacts on the Construction Industry, economically as well as it effects on scheduling.	R. Williams
54	Comparison of Wind Forces on buildings using STAR CM ++ software and ASCE 7-05 code.	Comparative study on the accuracy of Civil Engineering soft ware using Computational Fluid Dynamics Theory.	R. Williams

