

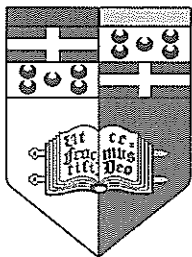
Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Research

Area:	Internet of Things / Internet of Everything
Project Supervisor:	Ernest Cachia
Project Co-supervisor: (if applicable)	Anyone is welcome
Main Subject Area/s: (keywords/tags: not more than 5)	IoT specification languages; IoT modelling; Protocol design; Real-Time modelling.
Brief Project Description inc. References: (word limit approx. 300 words)	
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Ideally, study-units pertaining to software development and software engineering.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	
<p>Deadline: Sunday 8th January 2017. To be submitted to cis.ict@um.edu.mt</p>	



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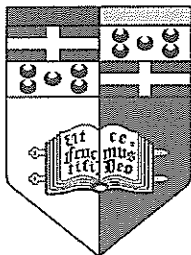
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Research

Area:	Software Engineering and solution modelling
Project Supervisor:	Ernest Cachia
Project Co-supervisor: (if applicable)	Anyone is welcome
Main Subject Area/s: (keywords/tags: not more than 5)	Software development techniques; software description models; system specification; extending current notation capabilities.
Brief Project Description inc. References: (word limit approx. 300 words)	
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Ideally, study-units pertaining to software development and software engineering.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	

Deadline: Sunday 8th January 2017. To be submitted to cis.ict@um.edu.mt



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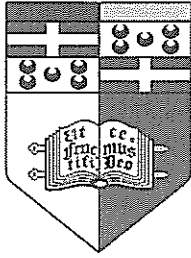
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Research

Area:	Software project management
Project Supervisor:	Ernest Cachia
Project Co-supervisor: (if applicable)	Anyone is welcome
Main Subject Area/s: (keywords/tags: not more than 5)	Software project effectiveness; estimation tools; resource management.
Brief Project Description inc. References: (word limit approx. 300 words)	
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Ideally, study-units pertaining to software development and software engineering.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	

Deadline: Sunday 8th January 2017. To be submitted to cis.ict@um.edu.mt



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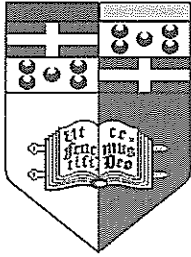
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Research

Area:	Human-instrument interaction
Project Supervisor:	Ernest Cachia
Project Co-supervisor: (if applicable)	Anyone is welcome
Main Subject Area/s: (keywords/tags: not more than 5)	Instrumentation design; dashboard/cockpit/control panel layouts.
Brief Project Description inc. References: (word limit approx. 300 words)	
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Ideally, study-units pertaining to software development and software engineering and HCI basics.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	

Deadline: Sunday 8th January 2017. To be submitted to cis.ict@um.edu.mt



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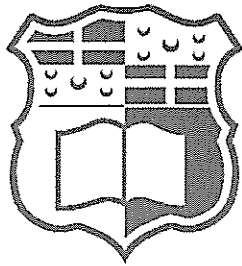
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Research

Area:	Flow control management
Project Supervisor:	Ernest Cachia
Project Co-supervisor: (if applicable)	Anyone is welcome
Main Subject Area/s: (keywords/tags: not more than 5)	Graph-specified systems; transport systems; crowd management; optimisation of flow; high-level description languages.
Brief Project Description inc. References: (word limit approx. 300 words)	
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3^d Year Study-units:	Ideally, study-units pertaining to software development and software engineering and graph-based modelling.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	

Deadline: Sunday 8th January 2017. To be submitted to cis.ict@um.edu.mt



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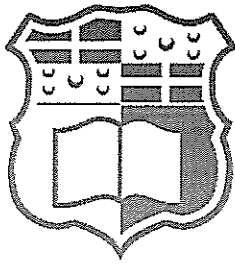
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Lecturers

Area:	<i>Database Data Modelling</i>
Project Supervisor:	Dr. Joseph Vella
Project Co-supervisor: (if applicable)	A number available on case by case basis
Main Subject Area/s: 'keywords/tags: not more than 5)	<i>Post-Relational, Document based (NoSQL), Graph based, Deductive, Specialized Data Models</i>
Brief Project Description inc. References: (word limit approx. 300 words)	<p>Data modelling is the basis with which data requirements, of a computer information system, are met. The more complete the constructed model is, with respect to these requirements, the easier is the system development required. Furthermore, it was now become very common that a set of data requirements are met with more than one data model – for example using relational for most requirements and then use specialized spatial data modelling to capture GIS data requirements.</p> <p>Since the relational data model it has become apparent that other issues are dependent on the chosen data modelling language. Some are qualitative, for example what type of query languages operate on the data modeled, and others actually affect aspects of system performance.</p> <p>Previously we have used Open-sourced DBMS (e.g. PostgreSQL, MongoDB, Neo4j), Oracle, MS SQL Server, DB2.</p>
Resources Required: (if student needs to buy them)	None
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	CIS3107 - Advanced Databases: Data Mining and Warehousing
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	None

Deadline: Friday 5th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lillian.ali@um.edu.mt



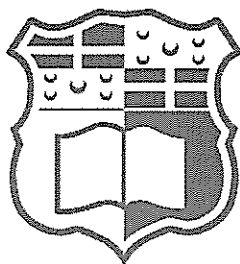
Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Lecturers

Area:	<i>DBMS set-up, tuning and administration</i>
Project Supervisor:	Dr. Joseph Vella
Project Co-supervisor: (if applicable)	A number available on case by case basis
Main Subject Area/s: (keywords/tags: not more than 5)	<i>DBMS set-up, tuning, & administration, Data security (at database level), Query Processing and Optimization, Data interoperability mechanisms</i>
Brief Project Description inc. References: (word limit approx. 300 words)	<p>A DBMS is a complex software system. Nonetheless DBMSs cater for a wide array of data requirements and corresponding operational requirements (e.g. query response and transactional throughput claims). Whether the implementation of data requirements opt for a centralized, distributed, cloud or hybrid cloud set-up, a substantial effort is required to set a DBMS up to manage and control the access characteristics; this is further complicated by the time changing operational requirements of databases. Together with system level set-up, some data requirements and operational constraints need to be addressed at query or transaction level (e.g. a set of queries are taking too long to refresh a web page, transaction posting throughout seems to noise drop once a certain level is reached).</p> <p>To solve these issues one must clinically understand the problem and attempt to evaluate which technique would yield a better solution. For example the use of new indexing structure together with a change of how data is posted could be an ideal solution in a given set-up.</p> <p>Previously we have used Open-sourced DBMS (e.g. PostgreSQL, MongoDB, Neo4j), Oracle, MS SQL Server, DB2.</p>
Resources Required: (if student needs to buy them)	None
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	CIS3107 - Advanced Databases: Data Mining and Warehousing
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	None
Deadline: Friday 5th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt	



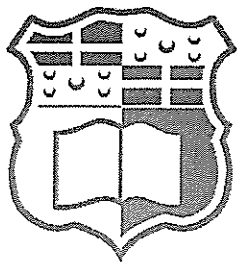
Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Lecturers

Area:	<i>Digital Forensics (informatics aspects).</i>
Project Supervisor:	Dr. Joseph Vella
Project Co-supervisor: <i>(if applicable)</i>	A number available on case by case basis
Main Subject Area/s: <i>(keywords/tags: not more than 5)</i>	<i>Digital forensics investigations, Evidence collection methods</i>
Brief Project Description inc. References: <i>(word limit approx. 300 words)</i>	<p>Digital forensics is the science of identifying evidence from digital sources and which provides the forensic experts with robust tools and techniques to solve complicated digital-related crimes (B Carrier, 2002).</p> <p>We have had a good number of FYPs in this area: creating a song recognition system (e.g. requested to handle song royalties collection); file curving of image files with a novel process; relating crime occurrences with geo, social and road networks; and create a visualization of a company's email corpus (usually required in fraud investigations).</p> <p>Previously we have used Open-sourced DBMS (e.g. PostgreSQL) and other freely and publically available packages.</p>
Resources Required: <i>(if student needs to buy them)</i>	None
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	<p>CIS3089 - Digital Forensics</p> <p>CIS3107 - Advanced Databases: Data Mining and Warehousing</p>
Foreseeable Ethical Issues and How these will be tackled: <i>(if applicable)</i>	None
<p>Deadline: Friday 5th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lillian.ali@um.edu.mt</p>	



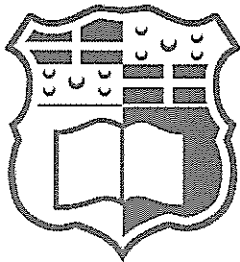
Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Lecturers

Area:	<i>Data mining & Data Warehousing: with massive datasets</i>
Project Supervisor:	Dr. Joseph Vella
Project Co-supervisor: (if applicable)	A number available on case by case basis
Main Subject Area/s: (keywords/tags: not more than 5)	<i>Data Mining, Data Warehousing, ETL processes, Data Integration & Consolidation</i>
Brief Project Description inc. References: (word limit approx. 300 words)	<p>Offering data owners the added benefit from their databases has long been a push on technology and data warehousing and data mining are a result of this push. Nonetheless, as Italians say, "tra il dire e il fare c'è di mezzo il mare". Collating and consolidating data from multiple and internal sources (including running checks on the imported data, harmonizing the different sources), integrating with external data takes a great effort (i.e. financially expensive). Also, even for all best laid plans for data integration there are other contributing issues that affect success: e.g. level of data quality of the sources, a good team (i.e. not only IT people) to take ownership of project.</p> <p>Once a good dataset is available, and here we assume it's bigger than main memory can fit, a number of pattern matching and pattern extraction processes are applied. In many cases a short response time is expected. To meet this operational criteria, aggressive techniques in query processing and optimization are required. Unfortunately, the choices are hard to implement because it's a well-known fact that for finding "golden nuggets" of information in a Warehouse or through a data mining exercise the queries required are non-trivial and required substantial computation. Nonetheless many such challenges have been met when using sophisticated methods of query optimization and data placement.</p> <p>Previously we have used Open-sourced DBMS (e.g. PostgreSQL), Oracle, MS SQL Server, specialized tools (e.g. for ETL).</p>
Resources Required: (if student needs to buy them)	None
Recommended Prerequisites / Knowledge Required and 3rd Year Study-units:	CIS3107 - Advanced Databases: Data Mining and Warehousing
Foreseeable Ethical Issues:	None
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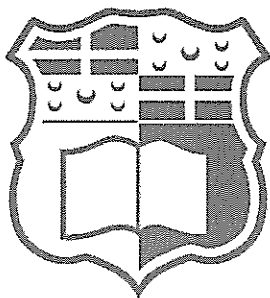
Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Lecturers

Area:	<i>Scalability issues over distributed data</i>
Project Supervisor:	Dr. Joseph Vella
Project Co-supervisor: (if applicable)	A number available on case by case basis
Main Subject Area/s: (keywords/tags: not more than 5)	<i>ACID and other transactional models, Data replication, Data consistency across partitions, Data partitioning</i>
Brief Project Description inc. References: (word limit approx. 300 words)	<p>The ACID principles in database transaction processing has meet many demanding requirements with great success. Yet meting the ACID principles in centralized databases was never an easy task either for DBMSs or database designers. Adding data partitioning and replicating partitions across data servers have strained what demand ACID based transactional systems can provide and scale up to.</p> <p>It has been noted, and later proven, that in the presence data partitioning one had to adopt either availability or else data consistency (but not both). Actually it was proven that one can only entertain any two and the third is unachievable. A trend, attributed to the NoSQL resurgence, was to design DBMS from the bottom up to meet scalability targets in these environments. Initially they advocated adopting other transactional principles (e.g. BASE rather than ACID), different but limited data models, and offer better distributed data placement management. These have had a level of success; but it's obvious that the more successful NoSQL engines are sharpening their lax data and transactional modelling as, for example, BASE principles are not acceptable for many business processes.</p> <p>Previously we have used Open-sourced DBMS (e.g. PostgreSQL), Oracle, MS SQL Server, specialized tools (e.g. for ETL).</p>
Resources Required: (if student needs to buy them)	None
Recommended Prerequisites / Knowledge Required and 3rd Year Study-units:	CIS3107 - Advanced Databases: Data Mining and Warehousing
Foreseeable Ethical Issues:	None
Deadline: Friday 5th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lillian.ali@um.edu.mt	



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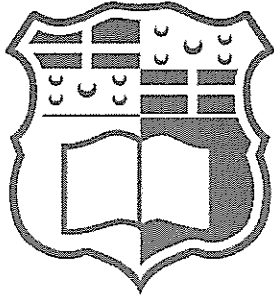
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Title/Area:	EFFECTIVE CAR TRAFFIC MANAGEMENT USING DIFFERENT TECHNOLOGIES (Possibly: Social Networking, Mobile Applications, Simulation Techniques etc.)
Project Supervisor:	Tony Spiteri Staines
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Traffic Management, Expert Systems, Decision Support Systems. Modeling, Software Development
Brief Project Description inc. References: (word limit approx. 300 words)	Car traffic management issues in Malta can be identified and effective solutions are to be proposed. The best solution is to be implemented in the form of a working system and its impact should be verifiable against the real world problem.
Resources Required: (if student needs to buy them)	Software Modeling tools, Mobile applications, Programming frameworks
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Software Engineering and Software Development Methods. The student needs to be conversant with software development applications and capable of implementing a complete system.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	

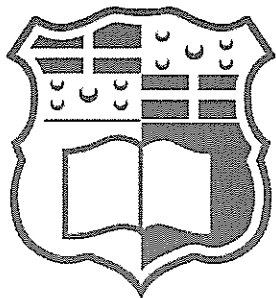
Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt



Faculty of ICT
B.Sc. I.T. (Hons.) in Software
Development
ICT3904 (Final Year Project in
Software Development)
Proposal Form for Lecturers

Title/Area:	Responding to PowerShell attacks.
Project Supervisor:	Mark Vella
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Memory Forensics; Digital Investigation; PowerShell malware; Fileless malware.
Brief Project Description inc. References: (word limit approx. 300 words)	<p>Windows PowerShell is Microsoft's task automation framework [1], consisting of a command-line shell and associated scripting language built on top of .NET Framework. PowerShell provides full access to Component Object Model (COM) and Windows Management Instrumentation (WMI), enabling administrators to perform administrative tasks on both local and remote Windows systems. Beyond these enticing capabilities, malware authors are finding the abuse of PowerShell appealing also for stealth, due to the fact the PowerShell process is often white-listed by security products, as well as due to the opportunity of file-less persistence. The PETYA ransomware [2], Ursnif [3] and EMOTET [4] financial malware are three popular campaigns that have abused PowerShell.</p> <p>The aim of this project is to leverage in-memory artifacts [5] produced by PowerShell in order to: i) enable the digital investigation of such attacks from memory dumps; ii) expose such abuses to end-users; iii) provide an access control mechanism to outright prevent future abuses. Realization of these objectives requires analyzing and patching PowerShell's process space [6] and bytecode for its cmdlets [7]. This is similar to recent work that focuses on Dalvik bytecode and its host processes [8].</p> <p>[1] Pontiroli, S. M., & Martinez, F. R. (2015). The Tao of .NET and PowerShell Malware Analysis. In <i>Virus Bulletin Conference</i>.</p> <p>[2] Bonderud, D. Ransomware Ramp-Up: Boot Processes, PowerShell Under Attack, https://securityintelligence.com/news/ransomware-ramp-up-boot-processes-powershell-under-attack/ [Accessed: 08/01/2018]</p>

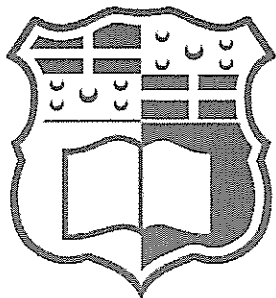
	<p>[3] Kesseem, L. Ursnif Campaign Waves Breaking on Japanese Shores, https://securityintelligence.com/ursnif-campaign-waves-breaking-on-japanese-shores/ [Accessed: 08/01/2018]</p> <p>[4] Bonderud, D. Infection Immunity: Has Banking Trojan Emotet Outsmarted Itself?, https://securityintelligence.com/news/infection-immunity-has-banking-trojan-emotet-outsmarted-itself/ [Accessed: 08/01/2018]</p> <p>[5] Ligh, M. H., Case, A., Levy, J., & Walters, A. (2014). <i>The art of memory forensics: detecting malware and threats in Windows, Linux, and Mac memory</i>. John Wiley & Sons.</p> <p>[6] Dang, B., Gazet, A., & Bachaalany, E. (2014). <i>Practical reverse engineering: x86, x64, ARM, Windows kernel, reversing tools, and obfuscation</i>. John Wiley & Sons.</p> <p>[7] Demetrio, L. Get the source code of the PowerShell cmdlets, https://blogs.msdn.microsoft.com/luisdem/2016/05/19/get-the-source-code-of-the-powershell-cmdlets/ [Accessed: 08/01/2018]</p> <p>[8] Vella, M., & Cilia, R. (2017). Memory Forensics of Insecure Android Inter-app Communications. In <i>ICISSP</i> (pp. 481-486).</p>
Resources Required: (if student needs to buy them)	.Net Reflector – Eur 175.
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Prerequisites: aptitude for analyzing compiled code (machine instructions and bytecode). Supporting 3 rd yr units: CIS3089, CIS3041.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	
<p>Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt</p>	



Faculty of ICT
B.Sc. I.T. (Hons.) in Software
Development
ICT3904 (Final Year Project in
Software Development)
Proposal Form for Lecturers

Title/Area:	Responding to Android UI attacks.
Project Supervisor:	Mark Vella
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Memory Forensics; Digital Investigation; Android UI Attacks; Mobile Malware.
Brief Project Description inc. References: (word limit approx. 300 words)	<p>In their simplest form Android UI attacks are overlay attacks that cybercriminals employ to mask the smartphone's display while they do their dirty work, e.g. ToastAmigo [1], all along without asking for too many permissions. However security researchers have shown that combined with accessibility services, attackers can now set up a complete Man-In-The-Middle (MiTM) attack posture that can completely subvert the same UI attack defense mitigations put into place by Android developers [2]. In this respect, device take-over attacks when combined with device management apps e.g. PushBullet [3], similar to PC-based RAT attacks, are only incidents waiting to happen.</p> <p>The aim of this project is to firstly perform a threat analysis of the aforementioned device take-over attack. Secondly, digital investigation that combines persistent [4] and volatile memory [5] forensics is to be conducted in order to be able to investigate for various flavors of Android device take-overs when combining cloak-and-dagger with legitimate apps. Realization of the these objectives requires knowledge of Android internals [6] as well as the analysis and patching of Android apks [7], in a similar fashion to recent work on automated Android malware analysis [8].</p> <p>[1] Shick, S. Toast Overlay Attacks Prompt Malware Removal for Android User, https://securityintelligence.com/news/toast-overlay-attacks-prompt-malware-removal-for-android-users/ [Accessed: 08/01/2018] [2] Wang, D. Y., Savage, S., & Voelker, G. M. (2011, October). Cloak and dagger: dynamics of web search cloaking. In <i>Proceedings of the 18th ACM conference</i></p>

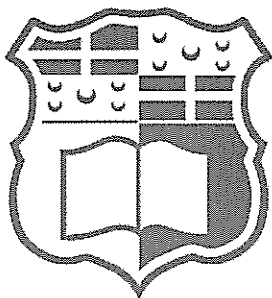
	<p>on Computer and communications security (pp. 477-490). ACM.</p> <p>[3] PushBullet, https://www.pushbullet.com/ [Accessed: 08/01/2018]</p> <p>[4] SleuthKit's Android Analyzer. http://sleuthkit.org/autopsy/docs/user-docs/3.1/android_page.html [Accessed: 08/01/2018]</p> <p>[5] Ligh, M. H., Case, A., Levy, J., & Walters, A. (2014). <i>The art of memory forensics: detecting malware and threats in Windows, Linux, and Mac memory</i>. John Wiley & Sons.</p> <p>[6] Gargenta, A. (2012). Deep dive into Android IPC/Binder framework. In <i>AnDevCon: The Android Developer Conference</i>.</p> <p>[7] SysSec. Reverse Engineering Android apks, http://www.syssec-project.eu/events/summer-school-2014/program/ [Accessed: 08/01/2018]</p> <p>[8] Leguesse, Y., Vella, M., Ellul, J. (2017). AndroNeo: Hardening Android malware sandboxes by predicting evasion heuristics. In <i>WISTP 2017</i>, Springer.</p>
Resources Required: <i>(if student needs to buy them)</i>	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	<p>Prerequisites: aptitude for analyzing compiled code (machine instructions and bytecode).</p> <p>Supporting 3rd yr units: CIS3089, CIS3041.</p>
Foreseeable Ethical Issues and How these will be tackled: <i>(if applicable)</i>	
<p>Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt</p>	



Faculty of ICT
B.Sc. I.T. (Hons.) in Software
Development
ICT3904 (Final Year Project in
Software Development)
Proposal Form for Lecturers

Title/Area:	Responding to Password Manager attacks.
Project Supervisor:	Mark Vella
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Memory Forensics; Digital Investigation; Password Manager Threats; Web Tracking Service Threats.
Brief Project Description inc. References: (word limit approx. 300 words)	<p>Web tracking services pose a critical security threat whenever they make use of secret login forms [1,2]. Specifically these forms can be leveraged to collect sensitive user details from web browsers that support password managers. The core of this issue lies within the trust that web content publishers have to place in third party tracking services, before the latter can provide them with the required market/user profiles. Furthermore, client-side script obfuscation complicates the detection of this abuse at the web content level. The risk involved is further aggravated in light of the upcoming General Data Protection Regulation (GDPR).</p> <p>The aim of this project is to leverage in-memory artifacts [3] produced by mainstream web browsers in order to: i) enable the digital investigation of such attacks from memory dumps; ii) expose such abuses to end-users; iii) provide an access control mechanism to outright prevent future abuses. Realization of these objectives requires analyzing and patching the process space [4] of mainstream web-browsers, similar to recent work that focuses on server-side web application threats [5].</p> <p>[1] Gunes, A (2017). No boundaries for user identities: Web trackers exploit browser login managers, https://freedom-to-tinker.com/2017/12/27/no-boundaries-for-user-identities-web-trackers-exploit-browser-login-managers/. [Accessed: 08/01/2018]</p> <p>[2] Silver, D., Jana, S., Boneh, D., Chen, E. Y., & Jackson, C. (2014, August). Password Managers: Attacks and Defenses. In <i>USENIX Security</i></p>

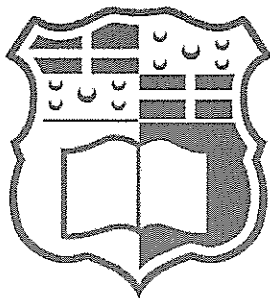
	<p><i>Symposium</i> (pp. 449-464).</p> <p>[3] Ligh, M. H., Case, A., Levy, J., & Walters, A. (2014). <i>The art of memory forensics: detecting malware and threats in Windows, Linux, and Mac memory</i>. John Wiley & Sons.</p> <p>[4] Dang, B., Gazet, A., & Bachaalany, E. (2014). <i>Practical reverse engineering: x86, x64, ARM, Windows kernel, reversing tools, and obfuscation</i>. John Wiley & Sons.</p> <p>[5] Bellizzi, J., & Vella, M. (2015, July). WeXpose: Towards on-line dynamic analysis of web attack payloads using just-in-time binary modification. <i>Inte-Business and Telecommunications (ICETE), 2015 12th International Joint Conference on</i> (Vol. 4, pp. 5-15). IEEE.</p>
Resources Required: <i>(if student needs to buy them)</i>	.Net Reflector – Eur 175.
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	<p>Prerequisites: aptitude for analyzing compiled code (machine instructions and bytecode).</p> <p>Supporting 3rd yr units: CIS3089, CIS3041.</p>
Foreseeable Ethical Issues and How these will be tackled: <i>(if applicable)</i>	
<p>Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt</p>	



Faculty of ICT
B.Sc. I.T. (Hons.) in Software Development
ICT3904 (Final Year Project in Software
Development)
Proposal Form for Lecturers

Title/Area:	Computer Security Issues in Automobiles
Project Supervisor:	Clyde Meli
Project Co-supervisor: <i>(if applicable)</i>	Mario Farrugia
Main Subject Area/s: <i>(keywords/tags: not more than 5)</i>	Computer security; communications; automobile hardware (e.g. ECU)
Brief Project Description inc. References: <i>(word limit approx. 300 words)</i>	Further investigation into this area of computer security
Resources Required: <i>(if student needs to buy them)</i>	ECU instrument cluster, Raspberry PI etc.
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	
Foreseeable Ethical Issues and How these will be tackled: <i>(if applicable)</i>	

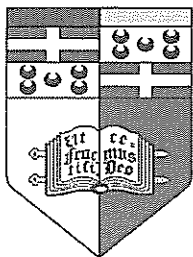
Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt



Faculty of ICT
B.Sc. I.T. (Hons.) in Software Development
ICT3904 (Final Year Project in Software Development)
Proposal Form for Lecturers

Title/Area:	Cyber Security including spam and malware
Project Supervisor:	Clyde Meli
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	computer security
Brief Project Description inc. References: (word limit approx. 300 words)	
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	

Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt



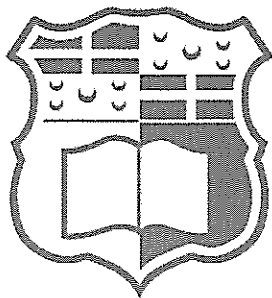
Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Lecturers

Area:	Human-Computer Interaction in Software Testing (HCI-Test)
Project Supervisor:	Dr Chris Porter
Project Co-supervisor: (if applicable)	Dr Mark Micallef
Main Subject Area/s: (keywords/tags: not more than 5)	HCI, Software Testing, Software Engineering, Human Factors, Ergonomics
Brief Project Description inc. References: (word limit approx. 300 words)	This body of work investigates software testing practices, toolsets and processes from an HCI perspective. It evaluates the impact of work practices on human testers as well as associated outputs. HCI techniques are applied to study human activity, performance and perceptions – tackling issues such as information anxiety, workload, efficiency, error rates and knowledge management amongst others. Software testing consists of various disciplines, including test automation, reporting, build pipelines, tooling, non-functional testing (e.g. accessibility, security, performance), bug-management, team-management, remote testing, communication, and so forth.
Resources Required: (if student needs to buy them)	NA
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Web development and software testing courses.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	NA



Faculty of ICT

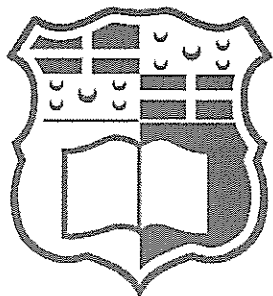
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Title/Area:	Bioinformatics
Project Supervisor:	Joseph Bonello
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Bioinformatics; Computational Biology
Brief Project Description inc. References: (word limit approx. 300 words)	Bioinformatics brings together multiple disciplines to improve our understanding of biological processes. It is an <i>umbrella term</i> for several different specialisations, including genome annotation, computational evolutionary biology and comparative genomics amongst others. In this area, we will use computational, data mining and machine learning techniques which will be applied to specific problems in Biology.
Resources Required: (if student needs to buy them)	Introduction to Bioinformatics, Arthur M. Lesk, 4th Edition. Oxford University Press. ISBN-10: 0199651566
Recommended Prerequisites / Knowledge Required and Supporting 3^d Year Study-units:	Some domain knowledge in Biology would be useful, but not essential as the student will be provided with some background.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	

Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt



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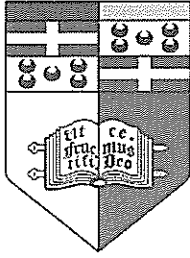
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

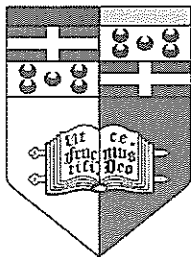
Title/Area:	Bioinformatics
Project Supervisor:	Joseph Bonello
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Data Science; Statistics; Machine Learning
Brief Project Description inc. References: (word limit approx. 300 words)	Data science is an interdisciplinary field that aims to gain insights from data of various forms, be they structured and unstructured. In data science, a number of techniques are employed to achieve this end, namely statistics, operations research, computer and information science, machine learning and pattern recognition among others.
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Good knowledge of a development language Mathematics Data structures
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	

Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt



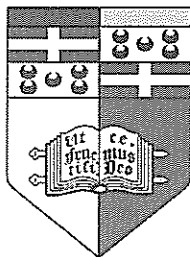
Faculty of ICT
B.Sc. I.T. (Hons.) in Software Development
ICT3904 (Final Year Project in Software
Development)
Areas of Lecturers

Area:	Machine Learning Optimisation through Parallelisation
Project Supervisor:	Michel Camilleri
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Optimisation, Genetic Algorithms, Swarm Based Optimisation, Parallel Computation
Brief Project Description inc. References:	This area explores the use of Swarm based techniques techniques for faster solution of optimisation problems and the use of multiple processing units and parallel processing techniques to achieve greater throughput
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	
Deadline: Thursday 15th Dec 2016. To be submitted to <u>randolph.mamo@um.edu.mt</u> and <u>shirley.borg@um.edu.mt</u>	



Faculty of ICT
B.Sc. I.T. (Hons.) in Software Development
ICT3904 (Final Year Project in Software
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Areas of Lecturers

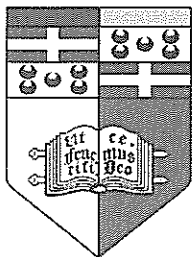
Area:	Geographic Information Systems and Business Intelligence
Project Supervisor:	Michel Camilleri
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	GIS, Database Systems, Information Systems
Brief Project Description inc. References:	This area explores the use of Spatial analytic techniques and visualisations within the context of business related information systems
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	
Deadline: Thursday 15th Dec 2016. To be submitted to <u>randolph.mamo@um.edu.mt</u> and <u>shirley.borg@um.edu.mt</u>	



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ICT3904 (Final Year Project in Software
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Areas of Lecturers

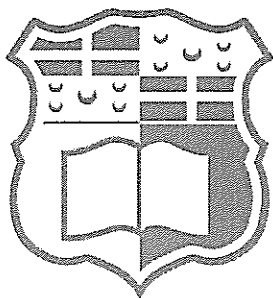
Area:	Geographic Information Systems and Vehicle Transport Systems
Project Supervisor:	Michel Camilleri
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	GIS, Database Systems, Transport Information Systems
Brief Project Description inc. References:	This area explores the use of Transport Information Systems, Spatial analytic techniques and visualisations within the context of Vehicle-based Transport related problems. The study aims to look at this multi-faceted problem mainly from the data management and data analytic perspectives.
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	

Deadline: Thursday 15th Dec 2016. To be submitted to
randolph.mamo@um.edu.mt and **shirley.borg@um.edu.mt**



Faculty of ICT
B.Sc. I.T. (Hons.) in Software Development
ICT3904 (Final Year Project in Software Development)
Areas of Lecturers

Area:	Transportation in Controlled Environments
Project Supervisor:	Michel Camilleri
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Navigational and control systems, Voice activation, Mobile devices
Brief Project Description inc. References:	This area explores the use of IT systems for the operation and management of vehicles transporting persons or materials in controlled environments, such as hospitals, care homes or domestic environments. This may also involve the use of alternative forms of data input and visualisation.
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	
Deadline: Thursday 15th Dec 2016. To be submitted to <u>randolph.mamo@um.edu.mt</u> and <u>shirley.borg@um.edu.mt</u>	



Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Title/Area:	eHealth (P ervasive E lectronic M onitoring in health care)
Project Supervisor:	Dr Conrad Attard
Project Co-supervisor: (if applicable)	Various Medical doctors at MD/SVP and researchers
Main Subject Area/s: (keywords/tags: not more than 5)	Wearable Electronic Systems for human activity recognition (HAR), Applications to Medical Diagnostics/Monitoring, Mobile Computing, Internet of things (IOT)
Brief Project Description inc. References: (word limit approx. 300 words)	<p>It has been estimated that up to 75% of healthcare spending is on chronic disease management. Mainly cardiovascular disease, cancer, diabetes and obesity among others. (World Health Organization, 2010).</p> <p>Pervasive Electronic Monitoring (PEM) aims at automating the patient administration process in healthcare facilities and logging information related to patients by using wearable devices. When a patient is admitted to a healthcare facility, she/he may require a number of different tests that may need to be carried out in different departments. To carry out these tests, healthcare professionals require the patient's history as well as detailed information about the patient's past clinical data.</p> <p>Currently this area has (and on going) investigated and implemented the following:</p> <ul style="list-style-type: none"> . 1) (PACSim) Pervasive Activity Context Simulator current version 2.0 - a simulator to generate incomplete data from wearable devices. (On going) . 2) Setup indoor location at St Vince de Paule to collect data. An indoor location-based system using a wearable device to determine the location of the user-based on

fingerprinting against a set of known WiFi access points.

- . 3) Setup HAR human activity recognition at SVP and will be extended to our labs at UOM. (*On going*)
- . 4) Designed and implemented first phase of a portal to upload and manage sites to log information at various sites using wireless. (*On going*)
- . 5) Design a first prototype of wearable device to log human activity. Generating datasets of human activities in pervasive spaces using wearable devices.
- . 6) Usability Studies for a reporting tool available through tablets for caregivers. (*On Going*)

In recent years, healthcare systems have evolved and more patient data is being kept electronically. Healthcare professionals make use of a variety of tools to extract and manage the patient's data by electronically searching the patient's records as soon as the patient arrive for the test.

The focus of the proposed work will extend the concept of patient information to include real-time location- based information within healthcare facilities while logging human activity recognition (HAR) such as eating walking sleeping etc. Patients such as those suffering from chronic debilitating diseases (such as Alzheimer's, Parkinson's and onset ALS) require constant monitoring, a requirement that must also preserve a patient's dignity by not appearing excessive.

The goals of the new approach are the improved management of the chronic disease through encouraging lifestyle changes and the effective early detection and treatment of any problem before it necessitates costly emergency intervention.

Extra reading: O. D. Lara and M. A. Labrador, "A Survey on Human Activity Recognition using Wearable Sensors," in *IEEE Communications Surveys & Tutorials*, vol. 15, no. 3, pp. 1192-1209, Third Quarter 2013.

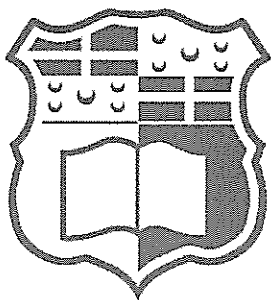
doi: 10.1109/SURV.2012.110112.00192

Some examples of titles and brief description of projects can be found at:

<http://conradattard.com/about/projects-and-supervision/>

For more information contact me at
conrad.attard@um.edu.mt

Resources Required: <i>(if student needs to buy them)</i>	If they are not already available from the research project, Bluetooth beacons, smart watches and mobile devices.
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	CIS 3086, CIS 3087 and CIS 3187
Foreseeable Ethical Issues and How these will be tackled: <i>(if applicable)</i>	
<p style="text-align: center;"> Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lillian.ali@um.edu.mt </p>	



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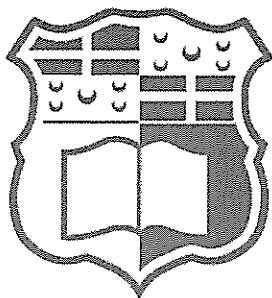
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Title/Area:	A Visual Head Set for the Visually impaired.
Project Supervisor:	Dr John Abela
Project Co-supervisor: (if applicable)	N/A
Main Subject Area/s: (keywords/tags: not more than 5)	Google Glass, visual reality headset, QR Codes
Brief Project Description inc. References: (word limit approx. 300 words)	The objective of this research is to develop a system that, using audio notifications, helps persons who are visually impaired to navigate an unknown environment. The headset will capture images of the environment and look for visual cues (features). The text to speech engine will then give audio notifications to the wearer.
Resources Required: (if student needs to buy them)	None required
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	A course in data structures and algorithms.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	No personal data is used.

Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lillian.ali@um.edu.mt



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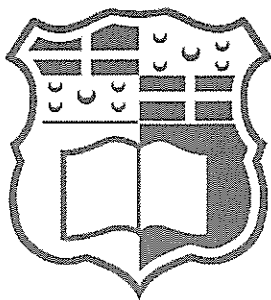
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Title/Area:	Image Similarity using Convolutional Neural Networks
Project Supervisor:	Dr John Abela
Project Co-supervisor: (if applicable)	N/A
Main Subject Area/s: (keywords/tags: not more than 5)	Deep learning, convolutional neural networks, Python, image processing, pattern recognition.
Brief Project Description inc. References: (word limit approx. 300 words)	Convolutional neural networks are part of the deep learning revolution that is taking the machine learning world by storm. CNNs can be used to identify features in images. Using Python and the Tensorflow library we shall use CNNs to look for specific features in images and then use the features found to classify images.
Resources Required: (if student needs to buy them)	None required
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	A course in data structures and algorithms. Some knowledge of image processing.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	No personal data is used.

Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt



Faculty of ICT

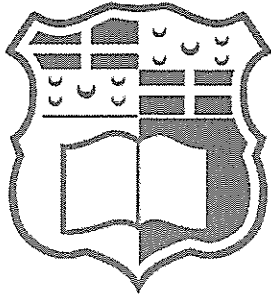
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

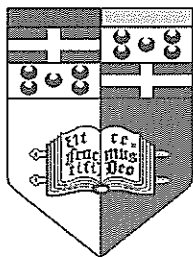
Title/Area:	Stored Digital Records in a Blockchain
Project Supervisor:	Dr John Abela
Project Co-supervisor: (if applicable)	N/A
Main Subject Area/s: (keywords/tags: not more than 5)	Blockchain, distributed ledgers, smart contracts, Ethereum
Brief Project Description inc. References: (word limit approx. 300 words)	A Blockchain is a specific type of an immutable distributed ledger. We will use the Ethereum Blockchain to store digital records in such a way as to ensure that the records cannot be deleted or modified. Candidate digital records include certificates of asset ownership such as property, cars, planes, etc.
Resources Required: (if student needs to buy them)	None required
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	A course in data structures and algorithms. Some knowledge of distributed ledger technologies.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	No personal data is used.

Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt



Faculty of ICT
B.Sc. I.T. (Hons.) in Software Development
ICT3904 (Final Year Project in Software
Development)
Proposal Form for Lecturers

Title/Area:	Digital Forensics - Looking for Evidence in Emails
Project Supervisor:	Dr John Abela
Project Co-supervisor: (if applicable)	N/A
Main Subject Area/s: (keywords/tags: not more than 5)	Natural language processing, pattern recognition, digital forensics.
Brief Project Description inc. References: (word limit approx. 300 words)	The purpose of the research is to build software artefacts that can be used to look for evidence of 'suspicious behaviour' in email text. Email will be parsed, stopwords removed, and then lemmatized. A 'semantic model' is built from each email and this is compared to others to identify emails that are semantically similar.
Resources Required: (if student needs to buy them)	None required
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	A course in data structures and algorithms. Knowledge of Python.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	All email data will be sanitized and anonymized.



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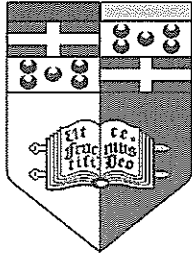
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Lecturers

Area:	Scheduling, Timetabling, Combinatorial Optimisation Problems
Project Supervisor:	Dr. Colin Layfield
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Operations Research; Combinatorial Optimisation; Heuristics; Metaheuristics; Artificial Intelligence
Brief Project Description inc. References: (word limit approx. 300 words)	Past projects or areas of interest include: University Examination Timetabling University Course and Room Timetabling Single Line Rail Optimisation Problem Job Shop Scheduling
Resources Required: (if student needs to buy them)	Laptop/PC
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Graph Theory, Comfortable with Mathematics, Algorithms
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	None

Deadline: Thursday 15th Dec 2016. To be submitted to randolph.mamo@um.edu.mt and shirley.borg@um.edu.mt



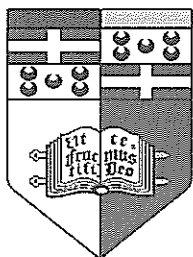
Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Lecturers

Area:	Natural Language Processing (Latent Semantic Analysis), Machine Learning
Project Supervisor:	Dr. Colin Layfield
Project Co-supervisor: (if applicable)	(Dr. Joel Azzopardi/Dr. Chris Staff depending on project)
Main Subject Area/s: (keywords/tags: not more than 5)	LSA; Semantic Similarity; Clustering; Human Computer Interaction
Brief Project Description inc. References: (word limit approx. 300 words)	Past projects or areas of interest include: Automated Essay Assessment Clustering of Bookmarks / Bookmark Recommendations Search Results Clustering LSA for interface analysis Adaptive Interfaces
Resources Required: (if student needs to buy them)	Laptop/PC
Recommended Prerequisites / Knowledge Required and Supporting 3^d Year Study-units:	Linear Algebra, Statistical Analysis, CIS2105 (for HCI related venues)
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	Depends on project. If human subjects involved with web based work
Deadline: Thursday 15th Dec 2016. To be submitted to randolph.mamo@um.edu.mt and shirley.borg@um.edu.mt	



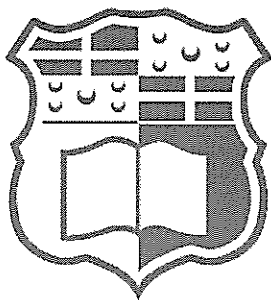
Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Lecturers

Area:	Human Computer Interaction ; Interface Design/Analysis; Novel interfaces on applications
Project Supervisor:	Dr. Colin Layfield
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	HCI; Interface Design; Evaluation of Interface Design; Natural Language Processing Methods applied to Interface Analysis (Latent Semantic Analysis)
Brief Project Description inc. References: (word limit approx. 300 words)	<p>Past projects or areas of interest include:</p> <p>Design / Analysis of interface for a computerized voting machine</p> <p>Design / Analysis of mobile interfaces</p> <p>Adaptive Interfaces</p> <p>Applying LSA to an interface for evaluation</p>
Resources Required: (if student needs to buy them)	Laptop/PC
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	<p>Prerequisite: CIS2105</p> <p>HCI ; Linear Algebra (for LSA related topics)</p>
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	Depends on project. If human subjects involved with web based work then a UREC application may be required.
<p>Deadline: Thursday 15th Dec 2016. To be submitted to randolph.mamo@um.edu.mt and shirley.borg@um.edu.mt</p>	



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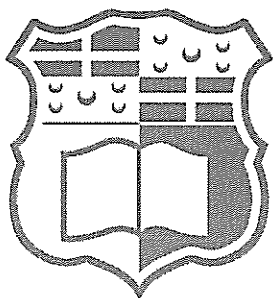
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Title/Area:	Routing Algorithms using the Neo4J Database
Project Supervisor:	Dr John Abela
Project Co-supervisor: (if applicable)	N/A
Main Subject Area/s: (keywords/tags: not more than 5)	Graph databases, graph algorithms, routing algorithms, GIS.
Brief Project Description inc. References: (word limit approx. 300 words)	Neo4J is one new breed of graph databases. In this type of non-relational database the data is stored as graphs (vertices and edges). Neo4J includes many in-built graph algorithms. The purpose of this research is to establish how Neo4J can be used for spatial GIS queries.
Resources Required: (if student needs to buy them)	None required
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	A course in data structures and algorithms.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	No personal data is used.

Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt



Faculty of ICT

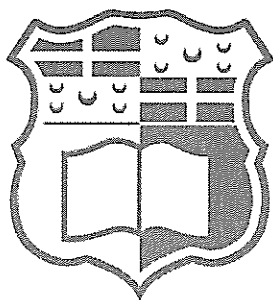
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Title/Area:	Data Science - Pervasive computing - Mobile Applications – APPS
Project Supervisor:	Dr Conrad Attard
Project Co-supervisor: (if applicable)	Dr Joseph Bonello and Dr Reuben Farrugia
Main Subject Area/s: (keywords/tags: not more than 5)	Mobile Computing, Apps, HCI/User Experience, data collected from multirotor & wearable devices
Brief Project Description inc. References: (word limit approx. 300 words)	<p>Mobile applications have gained popularity. A number of projects are being carried out within our department. Some of these are within the following domains; mobile commerce or m-commerce, sign language – gesture recognition, crowdsourcing through mobile, computer vision, the use of machine learning , designing a automated multirotor for real time data collection and wearable devices as data collection for human activity recognition and others.</p> <p>The following are some of the ongoing projects:</p> <ul style="list-style-type: none"> . 1) Investigating the Use of Wearable Devices and image recognition that Communicate to Mobile Devices for Sign Language . 2) Crowdsourcing Hazard Information to Produce Valid Warnings. . 3) Developing Applications for Mobile Applications within a Workplace Environment. . 4) Investigating personalisation when designing remote controls for Smart TV. <p>This area requires knowledge and skills from various domains depending on the proposal. There are various tools and techniques that can be used to design, implement the proposed</p>

	<p>experiment or collect useful data that will be required to evaluate the project proposed using a proper scientific approach.</p> <p>Some examples of titles and brief description of projects can be found at: http://conradattard.com/about/projects-and-supervision/ For more information contact me at conrad.attard@um.edu.mt</p>
Resources Required: <i>(if student needs to buy them)</i>	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	
Foreseeable Ethical Issues and How these will be tackled: <i>(if applicable)</i>	
<p>Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lillian.ali@um.edu.mt</p>	



Faculty of ICT

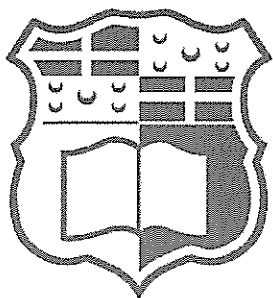
B.Sc. I.T. (Hons.) in Software Development

**ICT3904 (Final Year Project in Software
Development)**

Proposal Form for Lecturers

Area:	Enterprise Resource Planning (ERP), Designing solutions for Workplace Environment
Project Supervisor:	Dr Conrad Attard
Project Co-supervisor: (if applicable)	Various partners from industry, vendors of ERP solutions and clients implementing ERP solutions.
Main Subject Area/s: (keywords/tags: not more than 5)	User Requirements, ERP, Workplace Solutions, Knowledge Worker, Mobile Applications for ERP.
Brief Project Description inc. References: (word limit approx. 300 words)	<p>An ERP system is a packaged business software system that allows a company to automate and integrate the majority of its business processes, share common data and practices across the entire enterprise, and produce and access information in a real-time environment.</p> <p>An ERP system gives instructions at the workplace about how to organise activities related to co-workers, management and other elements in the business cycle.</p> <p>Before organisations implement new ERP software, it is important to define the business processes and requirements in detail. Business processes should be the foundation for your entire initiative.</p> <p>The area is currently being investigated as follows:</p> <ul style="list-style-type: none"> . 1) Manufacturing of food in a local franchise. . 2) Business process (BPMN) adopted for manufacturing module of ERP <p>for the category of micro, small and medium sized enterprises (SMEs) made up of enterprises, which employ fewer than 250 persons. 3) Knowledge sharing and capture at workplace</p>

	<p>using SNA.</p> <p>For this project various ERP vendors collaborate with faculty of ICT CIS department including Microsoft dynamics, SAP, Acumatica, Access and others. Particularly research has been focused locally on SMEs and manufacturing modules for factories.</p> <p>Extra Reading: Attard, C., Mountain, G. & Romano, D.M. (2016). Problem Solving, Confidence and Frustration when carrying out familiar tasks on a unfamiliar mobile Device. Computers in Human Behavior, Elsevier.</p> <p>http://dx.doi.org/10.1016/j.chb.2016.03.001</p> <p>Some examples of titles and brief description of projects can be found at: http://conradattard.com/about/projects-and-supervision/</p> <p>For more information contact me at conrad.attard@um.edu.mt</p>
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	CIS 3086,
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	
<p>Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt</p>	



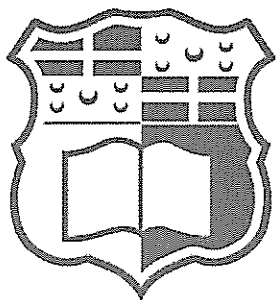
Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Title/Area:	Apps & educational games for children with disabilities
Project Supervisor:	Dr Peter A. Xuereb
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Android, games, augmented reality, learning, disability.
Brief Project Description inc. References: (word limit approx. 300 words)	Touchscreen interfaces and low cost tablets have become somewhat ubiquitous. Given their presence in the majority of people's homes, their popularity with children, and their gradual spread even into mainstream schools, such devices are being put more and more to educational use. Educational games for children are a result of these trends, but in the main these are often not accessible to, or appropriate for use by, children with disabilities. Tools and techniques for bridging the gaps and bringing modern technologies closer to those with disabilities, for educational purposes, are here the area being explored.
Resources Required: (if student needs to buy them)	10" tablet (or larger) may be necessary.
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Mobile development, web development, user interface design.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	Ensuring the wellbeing of the subjects, given that they are a vulnerable group (both children and having disabilities), will be a foremost consideration.



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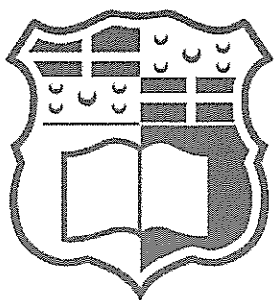
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Title/Area:	Computer Aided Design (CAD) and Building Information Management (BIM)
Project Supervisor:	Dr Peter A. Xuereb
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Computer Aided Design (CAD), CAD model data, Building Information Management (BIM), Industry Foundation Classes (IFC), interoperability in the architecture, engineering and construction (AEC) industry.
Brief Project Description inc. References: (word limit approx. 300 words)	A Building Information Model (BIM) is a digital representation of physical and functional characteristics of a facility: it is a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle; defined as existing from earliest conception to demolition. There are many projects that can be defined in this area that concern tying metadata to the CAD model data.
Resources Required: (if student needs to buy them)	Dependent on the project; the student should not need to purchase any resources him/herself
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Object oriented programming, databases.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	None.

Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt



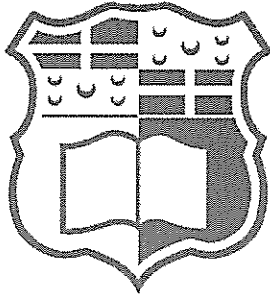
Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

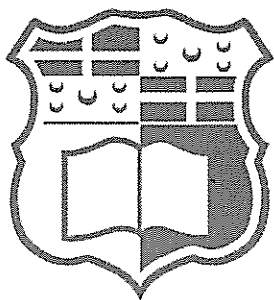
Proposal Form for Lecturers

Title/Area:	Harris Matrices
Project Supervisor:	Dr Peter A. Xuereb
Project Co-supervisor: (if applicable)	Mr Joseph Bonello
Main Subject Area/s: (keywords/tags: not more than 5)	Harris Matrices, data representation, data visualization, 3D modeling.
Brief Project Description inc. References: (word limit approx. 300 words)	In the domain of archaeology, methods and techniques for recording data on excavated sites are unstructured and rather archaic, as are those for data retrieval and subsequent use; the main resulting artefact produced in the process is called a Harris Matrix. By bringing modern tools and techniques from the domain of ICT to bear on the Harris Matrix, the aim is to increase the usefulness of the data captured in the Matrix – through, for example, better visualization and manipulation -- and thus also increase the productivity of archaeologists, who spend inordinate amounts of time trying to reconstruct an excavation from the relevant Harris Matrix.
Resources Required: (if student needs to buy them)	None.
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Web development, mobile development, data structures/algorithms.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	None.



Faculty of ICT
B.Sc. I.T. (Hons.) in Software Development
ICT3904 (Final Year Project in Software
Development)
Proposal Form for Lecturers

Title/Area:	Intelligent Transport Systems
Project Supervisor:	Dr Peter A. Xuereb
Project Co-supervisor: (if applicable)	Dr Lalit Garg, Dr Michel Camilleri
Main Subject Area/s: (keywords/tags: not more than 5)	ITS, databases, simulation, prediction, demand-based transport.
Brief Project Description inc. References: (word limit approx. 300 words)	Intelligent transportation systems (ITS) are applications which aim to provide innovative services relating to different modes of transport and traffic management, and enable users to be better informed and make 'smarter' use of transport networks. The focus of the work in this area is to develop applications that, using past and real time data, predict the demand on public transport and dynamically allocate resources to meet the demand.
Resources Required: (if student needs to buy them)	Simul8, Simulink, Matlab. Licences for these will be provided where necessary.
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Programming, mobile development.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	Dependent on the project.



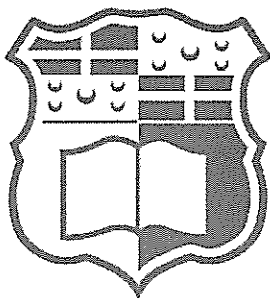
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B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

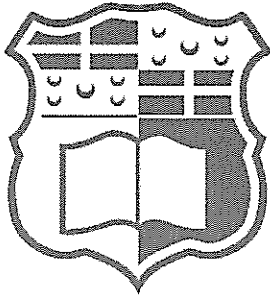
Title/Area:	Policing systems and data interpretation
Project Supervisor:	Dr Peter A. Xuereb
Project Co-supervisor: (if applicable)	Mr Joseph Bonello
Main Subject Area/s: (keywords/tags: not more than 5)	Policing, data science, business intelligence
Brief Project Description inc. References: (word limit approx. 300 words)	Whilst police are faced with man reports on a daily basis, they often lack the ability to extract meaningful information from the sea of data at their disposal. By bringing modern ICT-based tools and techniques to bear on this domain, police data can be analysed so as to provide the information necessary to be able to, for example, improve policing strategies, or nip emerging issues – such as hate crime - in the bud.
Resources Required: (if student needs to buy them)	Access to police data. Whilst some open data exists on the internet, it would be more interesting if a collaboration could be established with the Malta Police Force.
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Data structures, algorithms, Business Intelligence.
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	Any personal data will have to be anonymized by the police prior to release.



Faculty of ICT
B.Sc. I.T. (Hons.) in Software Development
ICT3904 (Final Year Project in Software Development)
Proposal Form for Lecturers

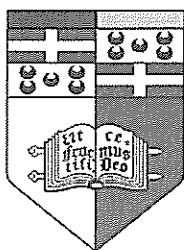
Title/Area:	Transport Systems in Controlled Environments
Project Supervisor:	Dr Peter A. Xuereb
Project Co-supervisor: (if applicable)	Dr Michel Camilleri
Main Subject Area/s: (keywords/tags: not more than 5)	
Brief Project Description inc. References: (word limit approx. 300 words)	TO AVOID DUPLICATION, PLEASE SEE SUBMISSION BY DR MICHEL CAMILLERI
Resources Required: (if student needs to buy them)	
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	

Deadline: Friday 12th Jan 2018. To be submitted to shirley.borg@um.edu.mt and lilian.ali@um.edu.mt



Faculty of ICT
B.Sc. I.T. (Hons.) in Software Development
ICT3904 (Final Year Project in Software
Development)
Proposal Form for Lecturers

Title/Area:	Voice recognition and mixed input applications
Project Supervisor:	Dr Peter A. Xuereb
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	Voice Recognition, Voice User Interface, databases, mobile platforms, touchscreen interfaces
Brief Project Description inc. References: (word limit approx. 300 words)	Although touchscreen devices are generally considered very intuitive and have become mainstream, predominantly due to their use in mobile phones, this mode of input is not always the most efficient or appropriate. In cases where a user is unable to use his hands and/or look directly at the screen for any length of time, voice driven interfaces may be more appropriate and safer. In some cases, the combination of voice, touchscreen, or conventional screen and keyboard input may prove to be a better combination than the exclusive use of one of these modes of input. This area investigates applications that fall into this category.
Resources Required: (if student needs to buy them)	Resources required should be obtainable without charge.
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	User interface design, databases, mobile development
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	Dependent on the project.



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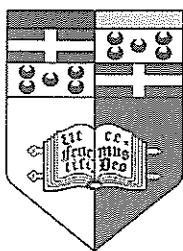
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Title/Area:	Implementing Business Intelligence in Government Institutions
Project Supervisor:	Dr Lalit Garg
Project Co-supervisor: (if applicable)	Peter A Xuereb
Main Subject Area/s: (keywords/tags: not more than 5)	ERP, Gaming Platform, Software Integration, e-Business
Brief Project Description inc. References: (word limit approx. 300 words)	<p>Malta is a leading European country in implementing e-governance. Business intelligence can help improving the performance and applications of e-governance better analyzing the big data collected by e-governance systems and promptly providing extended services learning about the users requirements other patterns.</p> <ol style="list-style-type: none"> 1. Madon, S., 2004. Evaluating the developmental impact of e-governance initiatives: an exploratory framework. <i>The Electronic Journal of Information Systems in Developing Countries</i>, 20(1), pp.1-13. 2. Heeks, R., 2001. <i>Understanding e-governance for development</i>. Manchester: Institute for Development Policy and Management. 3. Calista, D.J. and Melitski, J., 2007. E-government and e-governance: Converging constructs of public sector information and communications technologies. <i>Public Administration Quarterly</i>, pp.87-120. 4. Marche, S. and McNiven, J.D., 2003. E-government and e-governance: the future isn't what it used to be. <i>Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration</i>, 20(1), pp.74-86. 5. Saxena, K.B.C., 2005. Towards excellence in e-governance. <i>International Journal of Public Sector Management</i>, 18(6), pp.498-513. 6. Dawes, S.S., 2008. The evolution and continuing challenges of e-governance. <i>Public Administration Review</i>, 68(s1). 7. Coman, M., 2009. Business Intelligence and E-governance. <i>Lex ET Scientia International Journal</i>, 17, pp.484-491. 8. Tripathi, A. and Parihar, B., 2011, June. E-governance challenges and cloud benefits. In <i>Computer Science and Automation Engineering (CSAE), 2011 IEEE International Conference on</i> (Vol. 1, pp. 351-354). IEEE. 9. Rao, G.K. and Dey, S., 2011. Decision support for e-governance: a text mining approach. <i>arXiv preprint arXiv:1108.6198</i>.
Resources Required: (if student needs to buy them)	Internet Access, MS-Visual Studio, Library access, Access to high quality literature resources, tools for Business Intelligence, and e-Governance. Some of the tools will be provided by Crimsonwing
Recommended Prerequisites / Knowledge Required and	Knowledge of Business Intelligence, e-Business, good programming skills in a language of your choice, strong analytical and problem solving skills, fast

Supporting 3rd Year Study-units:	<p>learning abilities, reliable, responsible, hardworking, enthusiasm and determination to learn and acquire new skills.</p> <p>CIS3087 Business Intelligence</p> <p>CIS3089 Digital Forensics</p> <p>CIS3106 Emerging Technologies</p> <p>CIS3086 Mobile Device Programming</p> <p>CIS3107 Advanced Databases: Data Mining and Warehousing</p>
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	<p>Not any foreseeable ethical issue expected.</p>
<p>Deadline: Friday 12th January 2018. To be submitted to randolph.mamo@um.edu.mt and shirley.borg@um.edu.mt</p>	



Faculty of ICT

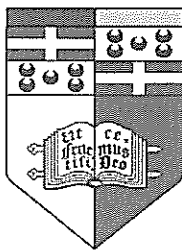
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Title/Area:	Integrating ERP Systems with Gaming Platforms
Project Supervisor:	Dr Lalit Garg
Project Co-supervisor: (if applicable)	Peter A Xuereb
Main Subject Area/s: (keywords/tags: not more than 5)	ERP, Gaming Platform, Software Integration, e-Business
Brief Project Description inc. References: (word limit approx. 300 words)	<p>Malta has many gaming organizations. These organizations use a very well-developed gaming platform. Also, they use a separate ERP system to manage their enterprise resources. However, being two separate systems, these are not very efficient and have some limitations. Integrating these together an integrated gaming ERP platform would not only be more efficient but would be better adaptable to the changes in the gaming platform better integrated with the organizations policies and maintenance and efficient running would be less expensive. This proposed project would explore opportunities and challenges to integrate ERP with the gaming platform and develop a prototype in collaboration with Crimsonwing.</p> <ol style="list-style-type: none"> 1. Malhotra, R. and Temponi, C., 2010. Critical decisions for ERP integration: Small business issues. <i>International Journal of Information Management</i>, 30(1), pp.28-37. 2. Hwang, Y. and Grant, D., 2011. Understanding the influence of integration on ERP performance. <i>Information Technology and Management</i>, 12(3), pp.229-240. 3. Siau, K. and Messersmith, J., 2002. Enabling technologies for e-commerce and ERP integration. <i>Quarterly Journal of Electronic Commerce</i>, 3, pp.43-52. 4. Sharif, A.M. and Irani, Z., 2005. Emergence of ERP II Characteristics within an ERP integration context. <i>AMCIS</i>.
Resources Required: (if student needs to buy them)	Internet Access, MS-Dynamics, MS-Visual Studio, Library access, Access to high quality literature resources, tools for ERP integration, Gaming Platform. Some of the tools will be provided by Crimsonwing
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	Knowledge of ERP, e-Business, Gaming Systems, good programming skills in a language of your choice, strong analytical and problem solving skills, fast learning abilities, reliable, responsible, hardworking, enthusiasm and determination to learn and acquire new skills.

	CIS3087 Business Intelligence CIS3089 Digital Forensics CIS3106 Emerging Technologies CIS3086 Mobile Device Programming CIS3107 Advanced Databases: Data Mining and Warehousing
<i>Foreseeable Ethical Issues and How these will be tackled: (if applicable)</i>	Not any foreseeable ethical issue expected.
Deadline: Friday 12th January 2018. To be submitted to <u>randolph.mamo@um.edu.mt</u> and <u>shirley.borg@um.edu.mt</u>	



Faculty of ICT

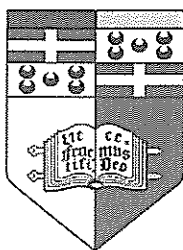
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Area:	EEG signal processing using machine learning
Project Supervisor:	Dr Lalit Garg
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	The project would assess and develop novel applications of AI/ML methods in EEG analysis and epileptic seizure detection. It would provide students an excellent opportunity to understand how AI/ ML methods can be used for real life problems and also developing skills in assessing and developing AI/ML tools.
Brief Project Description inc. References: (word limit approx. 300 words)	<p>Epilepsy is a serious neurological disease that has an adverse socio-economic impact on a substantial segment of the world population. A number of studies have been carried out in the past to explore the feasibility of a practical real-time seizure detector for effective management and mitigation of this disease [1]. With this goal in sight we have already developed/ proposed some novel methods using machine learning techniques such as singular vector machine (SVM) and extreme learning machine (ELM) [2-3] for seizure detection using an exhaustive scalp EEG data collected from pediatric patients. [2]. In this final year project (FYP), we will extend our work to develop novel machine learning approaches for seizure detection. Empirical datasets would be used to assess these novel approaches against existing approaches.</p> <ol style="list-style-type: none"> 1. Ali H. Shoeb, John V. Guttag: Application of Machine Learning To Epileptic Seizure Detection. ICML 2010: 975-982. 2. Huang, G. B., Wang, D. H., & Lan, Y. (2011). Extreme learning machines: a survey. International Journal of Machine Learning and Cybernetics, 2(2), 107-122. 3. Huang, G. B., Zhu, Q. Y., & Siew, C. K. (2006). Extreme learning machine: theory and applications. Neurocomputing, 70(1), 489-501. 4. Agrawal A, Garg L, Dauwels J (2013) Application of empirical mode decomposition algorithm for epileptic seizure detection from scalp EEG, The 35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'13) Osaka, Japan, 3-7 July 2013.
Resources Required: (if student needs to buy them)	A computing device (PC or Laptop), Internet Access, Matlab, C/C++, UM Library access, Access to high quality literature resources.

Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	<p>Knowledge of basic AI methods, good programming skills in a language of your choice, strong analytical and problem solving skills, fast learning abilities, reliable, responsible, hardworking, enthusiasm and determination to learn and acquire new skills.</p> <p>CIS3086 Mobile Device Programming</p> <p>CIS3087 Business Intelligence</p> <p>CIS3089 Digital Forensics</p> <p>CIS3106 Emerging Technologies</p> <p>CIS3107 Advanced Databases: Data Mining and Warehousing</p>
Foreseeable Ethical Issues and How these will be tackled: (if applicable)	<p>We have already got ethical approval for the project. Students would also require to apply for an ethical approval to the University's research ethics committee.</p>
<p>Deadline: Thursday 15th Dec 2016. To be submitted to randolph.mamo@um.edu.mt and shirley.borg@um.edu.mt</p>	



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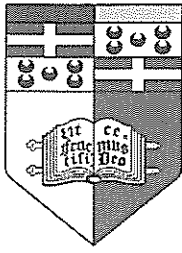
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Area:	Machine learning methods for handling missing data
Project Supervisor:	Dr Lalit Garg
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	The project would assess and develop novel applications of AI/ML methods in missing data handling in medical questionnaires. It would provide students an excellent opportunity to understand how AI/ ML methods can be used for real life problems and also developing skills in assessing and developing AI/ML tools.
Brief Project Description Inc. References: (word limit approx. 300 words)	<p>The proposed project is a part of a University funded project. Self-report questionnaires are used as an extremely valuable instrument to assess the quality of life of a patient, its relationship with socioeconomic and environmental factors, disease risk/ progress, treatment and disease burden, treatment response and quality of care. However, a common problem with such questionnaires is missing data. Despite enormous care and effort to prevent it, some level of missing data is common and unavoidable. Such missing data can have a detrimental impact on statistical analyses based on the questionnaire responses. A variety of methods have been suggested for missing data imputation. Nevertheless, more research is desperately needed to assess and improve the reliability of data imputation. We have already developed/ proposed some novel methods to handle missing data [1-4]. In this final year project (FYP), we will extend our work to develop novel machine learning procedures enforcing collaborative filtering to complete missing data in medical questionnaires. Empirical datasets would be used to assess these novel methods against existing methods.</p> <ol style="list-style-type: none"> 1. Garg L, Dauwels J, Earnest A, Pang L (2013) Tensor based methods for handling missing data in quality-of-life questionnaires. IEEE Journal of Biomedical and Health Informatics. In press. doi: 10.1109/JBHI.2013.2288803. 2. Asif MT, Srinivasan K, Garg L, Dauwels J, Jaillet P (2013) Low-dimensional Models for Missing Data Imputation in Road Networks, ICASSP 2013, May 26 - 31, 2013. 3. Dauwels J, Garg L, Earnest A, Pang LK (2012). Tensor Factorizations for Missing Data Imputation in Medical Questionnaires, The 37th

	<p>International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Kyoto, Japan, March 25 - 30, 2012.</p> <p>4. Dauwels J, Garg L, Earnest A, Pang LK (2011). Handling Missing Data in Medical Questionnaires Using Tensor Decompositions. The Eighth International Conference on Information, Communications, and Signal Processing (ICICS 2011). Singapore 13-16 December, 2011.</p>								
Resources Required: <i>(if student needs to buy them)</i>	<p>A computing device (PC or Laptop), Internet Access, Matlab, C/C++, UM Library access, Access to high quality literature resources.</p>								
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	<p>Knowledge of basic AI methods, good programming skills in a language of your choice, strong analytical and problem solving skills, fast learning abilities, reliable, responsible, hardworking, enthusiasm and determination to learn and acquire new skills.</p> <table> <tr> <td>CIS3087</td><td>Business Intelligence</td></tr> <tr> <td>CIS3089</td><td>Digital Forensics</td></tr> <tr> <td>CIS3106</td><td>Emerging Technologies</td></tr> <tr> <td>CIS3107</td><td>Advanced Databases: Data Mining and Warehousing</td></tr> </table>	CIS3087	Business Intelligence	CIS3089	Digital Forensics	CIS3106	Emerging Technologies	CIS3107	Advanced Databases: Data Mining and Warehousing
CIS3087	Business Intelligence								
CIS3089	Digital Forensics								
CIS3106	Emerging Technologies								
CIS3107	Advanced Databases: Data Mining and Warehousing								
Foreseeable Ethical Issues and How these will be tackled: <i>(if applicable)</i>	<p>We have already got ethical approval for the project. Students would also require to apply for an ethical approval to the University's research ethics committee.</p>								
<p>Deadline: Thursday 15th Dec 2016. To be submitted to randolph.mamo@um.edu.mt and shirley.borg@um.edu.mt</p>									



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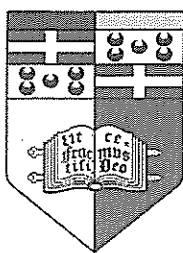
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Proposal Form for Lecturers

Area:	Hospital resource modelling
Project Supervisor:	Dr Lalit Garg
Project Co-supervisor: (if applicable)	
Main Subject Area/s: (keywords/tags: not more than 5)	The project would develop novel applications of AI/ML methods in the healthcare management problems such as hospital admission pattern analysis, bed resource requirements forecasting, allocation and management. It would provide students an excellent opportunity to understand how AI/ ML methods can be used for developing solutions to real life problems and also assessing effectiveness of such AI/ML tools.
Brief Project Description Inc. References: (word limit approx. 300 words)	<p>Healthcare resource planners need to develop policies that ensure optimal allocation of scarce healthcare resources. This goal can be achieved by analysing admission patterns to forecast daily resource requirements to ensure optimum allocation and management of available resources. If resources are limited, admission should be scheduled according to the resource availability. Such resource availability or demand can change with time. We here model admissions and patient flow through the care system as a discrete time Markov chain. In order to have a more realistic representation, a non-homogeneous model is developed which incorporates time-dependent covariates, namely a patient's present age and the present calendar year. However, more sophisticated models are required to better manage changes in admission patterns and resource requirements. As our previous work, we have already developed many such sophisticated models for better modelling admission patterns and resource requirements [1-4]. In this final year project (FYP), we will extend our work to develop novel approaches to effectively solve the problem using AI/ML based methods.</p> <ol style="list-style-type: none"> 1. Garg L, McClean SI, Meenan BJ, Millard PH (2010). A non-homogeneous discrete time Markov model for admission scheduling and resource planning in a care system. Health Care Management Science. 13(2):155–169. 2. Garg L, McClean SI, Meenan BJ, Millard PH (2009). Non-homogeneous Markov Models for Sequential Pattern Mining of Healthcare Data. IMA journal Management Mathematics. 20(4): 327-344.

	<p>3. Garg L, McClean SI, Meenan BJ, Barton M, Fullerton K (2012). Intelligent patient management and resource planning for complex, heterogeneous and stochastic healthcare systems. In press. IEEE Transactions on Systems, Man, and Cybernetics--Part A: Systems and Humans.</p> <p>4. Garg L, McClean SI, Meenan BJ, Barton M, Fullerton K (2013). An Extended Mixture Distribution Survival Tree for Patient Pathway Prognostication. Communications in Statistics: Theory and Methodology. 42(16):2912-2934.</p>
Resources Required: <i>(if student needs to buy them)</i>	A computing device (PC or Laptop), Internet Access, Matlab, C/C++, UM Library access, Access to high quality literature resources.
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	<p>Knowledge of basic AI methods, good programming skills in a language of your choice, strong analytical and problem solving skills, fast learning abilities, reliable, responsible, hardworking, enthusiasm and determination to learn and acquire new skills.</p> <p>CIS3086 Mobile Device Programming</p> <p>CIS3087 Business Intelligence</p> <p>CIS3089 Digital Forensics</p> <p>CIS3106 Emerging Technologies</p> <p>CIS3107 Advanced Databases: Data Mining and Warehousing</p>
Foreseeable Ethical Issues and How these will be tackled: <i>(if applicable)</i>	We have already got ethical approval for the project. Students would also require to apply for an ethical approval to the University's research ethics committee.
<p>Deadline: Thursday 15th Dec 2016. To be submitted to randolph.mamo@um.edu.mt and shirley.borg@um.edu.mt</p>	



Faculty of ICT

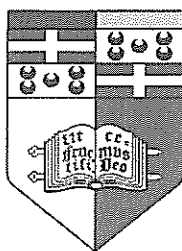
B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Lecturers

Area:	Brain mapping in eLearning and management
Project Supervisor:	Dr Lalit Garg
Project Co-supervisor: (if applicable)	Dr Owen Falzon
Main Subject Area/s: (keywords/tags: not more than 5)	The project would investigate if EEG or other imaging techniques can be used to identify a person's learning style (Kolb's), learning preferences, team player styles (Parker's) and personality.
Brief Project Description inc. References: (word limit approx. 300 words)	<p>The proposed project would require to perform the following steps:</p> <ol style="list-style-type: none"> 1. A literature review on learning styles, learning preferences, team player styles and personality. 2. Recruiting a large number of participants of different learning styles, learning preferences, team player styles and personality 3. Using questionnaires to establish learning styles, learning preferences, team player styles and personality of each participant. 4. Develop different tasks based on learning styles, learning preferences, team player styles and personality of participants. 5. Collecting EEG data while each participant performs the given tasks. 6. Analyze EEG through machine learning techniques to identify features in EEG signal related to difference learning styles, learning preferences, team player styles and personality. <p>References:</p> <ol style="list-style-type: none"> a. Kolb, D.A., 2000. Learning styles inventory. The Power of the 2 2 Matrix, p.267. b. Pashler, H., McDaniel, M., Rohrer, D. and Bjork, R., 2008. Learning styles concepts and evidence. Psychological science in the public interest, 9(3), pp.105-119. c. Murphy, R.J., Gray, S.A., Straja, S.R. and Bogert, M.C., 2004. Student learning preferences and teaching implications. Journal of dental education, 68(8), pp.859-866. d. Loo*, R., 2004. Kolb's learning styles and learning preferences: is there a linkage?. Educational Psychology, 24(1), pp.99-108. e. Parker, G.M., 1990. Team players and teamwork. San Francisco, CA: Jossey-Bass.

	<p>7. Huang, G. B., Zhu, Q. Y., & Siew, C. K. (2006). Extreme learning machine: theory and applications. <i>Neurocomputing</i>, 70(1), 489-501.</p> <p>8. Kirnan, J.P. and Woodruff, D., 1994. Reliability and validity estimates of the Parker team player survey. <i>Educational and Psychological Measurement</i>, 54(4), pp.1030-1037.</p> <p>9. Mischel, W., 2013. <i>Personality and assessment</i>. Psychology Press.</p> <p>10. Monti, D.A., Herring, C.L., Schwartzman, R.J. and Marchese, M., 1998. Personality assessment of patients with complex regional pain syndrome type I. <i>The Clinical journal of pain</i>, 14(4), pp.295-302.</p> <p>11. Kamphaus, R.W. and Frick, P.J., 2005. <i>Clinical assessment of child and adolescent personality and behavior</i>. Springer Science & Business Media.</p> <p>12. Edens, J.F., Cruise, K.R. and Buffington-Vollum, J.K., 2001. Forensic and correctional applications of the Personality Assessment Inventory. <i>Behavioral Sciences & the Law</i>, 19(4), pp.519-543.</p> <p>13. Caspi, A., Block, J., Block, J.H., Klopp, B., Lynam, D., Moffitt, T.E. and Stouthamer-Loeber, M., 1992. A "common-language" version of the California Child Q-Set for personality assessment. <i>Psychological Assessment</i>, 4(4), p.512.</p> <p>Mizuki, Y., Tanaka, M., Isozaki, H., Nishijima, H. and Inanaga, K., 1980. Periodic appearance of theta rhythm in the frontal midline area during performance of a mental task. <i>Electroencephalography and clinical neurophysiology</i>, 49(3), pp.345-351.</p>
Resources Required: <i>(if student needs to buy them)</i>	A computing device (PC or Laptop), Internet Access, Matlab, C/C++, UM Library access, Access to high quality literature resources.
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	<p>Knowledge of basic AI methods, good programming skills in a language of your choice, strong analytical and problem solving skills, fast learning abilities, reliable, responsible, hardworking, enthusiasm and determination to learn and acquire new skills.</p> <p>Artificial Vision Stream or Big Data Stream</p>
Foreseeable Ethical Issues and How these will be tackled: <i>(if applicable)</i>	We have already got ethical approval for the project. Students would also require to apply for an ethical approval to the University's research ethics committee.
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Faculty of ICT

B.Sc. I.T. (Hons.) in Software Development

ICT3904 (Final Year Project in Software Development)

Areas of Lecturers

Area:	Traffic problems in Malta										
Project Supervisor:	Dr Lalit Garg										
Project Co-supervisor: (if applicable)											
Main Subject Area/s: (keywords/tags: not more than 5)	The students would gain understanding how the modelling, simulation, resource allocation and scheduling methods might be used to solve a problem. Also, they would be able to develop skills of problem analysis, solution design, data collection and solution evaluation. Further they would be able to learn developing and implementing algorithms and logic to develop innovative solutions.										
Brief Project Description inc. References: (word limit approx. 300 words)	Increasing traffic congestion is becoming critical problem requiring urgent attention. To solve the problem it is necessary to understand the underlying causes, traffic dynamics and road networks in Malta. It is proposed to use Simul8, Matlab, Simulink or other modelling and simulation software to model and characterize the traffic dynamics, road network and factors affecting the traffic congestion in Malta. This information would then be used to estimate cost of traffic congestion to the economy and the environment and to prepare some guidelines and model solutions to the problem.										
Resources Required: (if student needs to buy them)	Internet Access, Matlab, Simulink, Simul8 (will be provided), Mobile application development tools, Library access, Access to high quality literature resources.										
Recommended Prerequisites / Knowledge Required and Supporting 3rd Year Study-units:	<p>Knowledge of basic AI/BI methods, Good programming skills in a language of your choice. Strong analytical and problem solving skills and fast learning abilities, reliable, responsible, hardworking, enthusiasm and determination to learn and acquire new skills.</p> <p>Supporting 3rd Year Study -units</p> <table border="0"> <tr> <td>CIS3086</td> <td>Mobile Device Programming</td> </tr> <tr> <td>CIS3087</td> <td>Business Intelligence</td> </tr> <tr> <td>CIS3089</td> <td>Digital Forensics</td> </tr> <tr> <td>CIS3106</td> <td>Emerging Technologies</td> </tr> <tr> <td>CIS3107</td> <td>Advanced Databases: Data Mining and Warehousing</td> </tr> </table>	CIS3086	Mobile Device Programming	CIS3087	Business Intelligence	CIS3089	Digital Forensics	CIS3106	Emerging Technologies	CIS3107	Advanced Databases: Data Mining and Warehousing
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CIS3087	Business Intelligence										
CIS3089	Digital Forensics										
CIS3106	Emerging Technologies										
CIS3107	Advanced Databases: Data Mining and Warehousing										
Foreseeable Ethical Issues and How these will be tackled:	There are no foreseeable ethical issues; however, the student would also require to apply for ethical approval to the university ethics committee.										

(if applicable)

Deadline: Thursday 15th Dec 2016. To be submitted to randolph.mamo@um.edu.mt and shirley.borg@um.edu.mt