

# 2u2i:

## Bachelor of Computer Science (Data Engineering)



The banner features logos for the Malaysian Government (KEMENTERIAN PENDIDIKAN TINGGI), UTM, MDEC, and CEO @ FACULTY UTM BERSAMA INDUSTRI. It includes portraits of YB Dato' Seri Idris Bin Jusoh and YBhg Dato' Yasmin Mahmood. The text details the event: 'MAJLIS PELANCARAN PROGRAM 2u2i PENJENAMAAN SARJANA MUDA SAINS KOMPUTER (KEJURUTERAAN DATA) & FORUM CEO @ FACULTY UTM BERSAMA INDUSTRI'.

**MAJLIS PELANCARAN PROGRAM 2u2i**  
PENJENAMAAN SARJANA MUDA SAINS KOMPUTER (KEJURUTERAAN DATA)  
& FORUM CEO @ FACULTY UTM BERSAMA INDUSTRI

Oleh  
**YB DATO' SERI IDRIS BIN JUSOH**  
MENTERI PENDIDIKAN TINGGI MALAYSIA

**YBHG DATO' YASMIN MAHMOOD**  
CEO MDEC

FORUM CEO @ FACULTY UTM  
BERSAMA INDUSTRI

17 NOVEMBER 2016 | DEWAN AZMAN HASHIM, MENARA RAZAK UTM KUALA LUMPUR | 2.00 PETANG

**Prof Dr Abdul Samad Ismail**

Dean Faculty of Computing  
Universiti Teknologi Malaysia



**Prof Bahar Bahar**  
Menteri Pendidikan Tinggi

## Program 2U2I penuh permintaan, tingkat kebolehpasaran graduan

Jalinan kerjasama bolehkan industri latih pelajar ikut keperluan semasa

**Prof Bahar Bahar** berkata, program 2U2I akan dilaksanakan pada 15 September ini. Beliau berkata, program ini akan memberi peluang kepada pelajar untuk memperolehi pengalaman praktikal di industri semasa mereka belajar di universiti. Beliau berkata, program ini akan memberi peluang kepada pelajar untuk memperolehi pengalaman praktikal di industri semasa mereka belajar di universiti.

Program 2U2I adalah inisiatif yang dilaksanakan oleh Kementerian Pendidikan Tinggi (KPT) dan Universiti Teknologi Malaysia (UTM) untuk meningkatkan kebolehpasaran graduan. Program ini akan memberi peluang kepada pelajar untuk memperolehi pengalaman praktikal di industri semasa mereka belajar di universiti. Beliau berkata, program ini akan memberi peluang kepada pelajar untuk memperolehi pengalaman praktikal di industri semasa mereka belajar di universiti.

## Tingkat kemahiran graduan

Penuntut belajar 2 tahun, timba pengalaman industri 2 tahun

Oleh Bahar Bahar  
bht@bh.com.my  
15 - 16  
Kuala Nerus

Kementerian Pendidikan Tinggi (KPT) akan memperkenalkan program Dua Tahun Universiti dan Dua Tahun Industri (2U2I) di beberapa universiti di seluruh negara mulai September depan. Menteri, Datuk Seri Idris Jusoh berkata, penuntut di universiti itu akan menjalani latihan bekerja dalam beberapa bidang dikenal pasti selama dua tahun, seterusnya mengikuti pengajian selama dua tahun. Katanya, melalui sistem itu penuntut yang menamatkan pengajian akan terus ditawarkan pekerjaan tanpa mengikuti kursus kemahiran. "Antara universiti yang akan melaksanakan sistem 2U2I ialah Universiti Malaysia Kelantan (UMK) dalam bidang keusahawanan, Universiti Putra Malaysia (UPM) dalam bidang pertanian dan Universiti Teknologi Mara (UTM) dalam bidang komunikasi," katanya selepas merasmikan Majlis Penutup Program Temuduga Terbuka Skim Latihan 1 Malaysia (SL1M) dan Gempak Keusahawanan Kerjaya (G2K) peringkat Zon Timur di UTM, semalam.



**Idris (tengah)** merasmikan Majlis Penutup Program Temuduga Terbuka Skim Latihan 1 Malaysia (SL1M) dan Gempak Keusahawanan Kerjaya (G2K) peringkat Zon Timur di UTM, semalam.

Yang turut hadir, Menteri di Jabatan Perdana Menteri, Datuk Seri Abdul Wahid Omar, Naib Canselor UTM, Profesor Datuk Dr Nor Aeni Mokhtar dan Ketua Pegawai Eksekutif Majlis Pembangunan Wilayah Ekonomi Pantai Timur (ECPET), Datuk Seri Jebasingan Issac John.

**Belajar sambil bekerja**  
Idris yang juga Ahli Parlimen Besut, berkata 2U2I adalah program belajar sambil bekerja yang membolehkan penuntut belajar selama dua tahun dan menimba pengalaman dalam industri selama dua tahun.

Untuk komen, hantar e-mel menerusi [bhnews@bh.com.my](mailto:bhnews@bh.com.my) atau di laman Facebook BH Online



**Idris bersama Zubaidi (dua dari kanan)** melawat pameran pada majlis Pelancaran Program 2U2I Jajazh Sarjana Muda Produksi dan Kesihatan Haiwan di UnisZA, semalam.

## Lima UA laksana program 2U2i mulai September

Program bantu universiti perkukuh hubungan dengan industri

Oleh Faizul Azlan Razak  
bht@bh.com.my  
Kuala Nerus

Lima universiti awam (UA) akan melaksanakan program pembelajaran akademik di kampus selama dua tahun dan menimba pengalaman industri selama dua tahun lagi (2U2i), mulai September ini. Universiti terabit ialah Universiti Sultan Zainal Abidin (UniZA), Universiti Malaysia Kelantan (UMK), Universiti Teknologi Malaysia (UTM), Universiti Putra Malaysia (UPM) dan Universiti Kebangsaan Malaysia (UKM). Menteri Pendidikan Tinggi, Datuk Seri Idris Jusoh, berkata pihaknya melihat pengalaman industri selari dengan Pelan Pembangunan Pendidikan Malaysia (PPPM) bagi melahirkan graduan holistik dengan ciri keusahawanan dan seimbang. "Program 2U2i juga antara platform terbaik bersifat seramang dua mata kerana membantu universiti memperkukuh hubungan dengan industri. Program dilaksanakan

Info

Program 2U2i

→ Belajar sambil bekerja, belajar dua tahun dan timba pengalaman dalam industri selama dua tahun lagi.  
→ Bagi tingkatan kebolehpasaran, persediaan, kemahiran pelajar universiti untuk alam pekerjaan.

untuk meningkatkan kebolehpasaran, persediaan dan kemahiran pelajar universiti untuk memasuki alam pekerjaan.

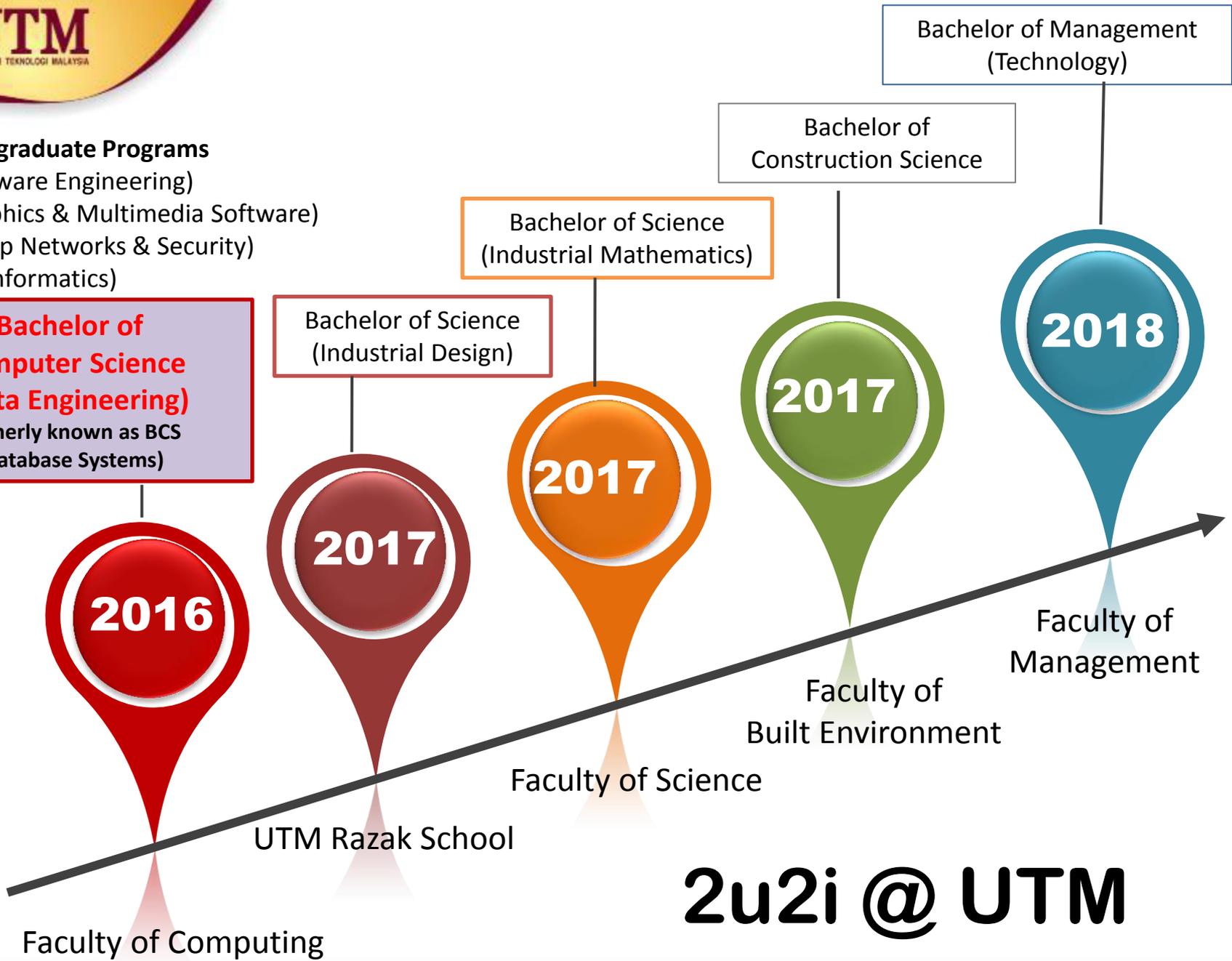
**Sasaran 80 peratus**  
"Malah, kita meletakkan sasaran 80 peratus kebolehpasaran apabila pelajar terbit matan matan pengajian," katanya selepas Pelancaran Program 2U2i dan Majlis Menandatangani Perjanjian Persefahaman (MoU) di antara UniZA dengan industri tempatan, di sini semalam. Yang turut hadir, Naib Canselor UniZA, Prof Datuk Dr Ahmad Zubaidi Abdul Latif; Ketua Pengarah Jabatan Pendidikan Tinggi, Prof Datuk Dr Asma Ismail dan Ketua Pegawai Eksekutif Agensi Kelayakan Malaysia (MQA), Prof Datuk Dr Rujhan Mustafa.

Idris berkata, jumlah universiti melaksanakan program 2U2i akan ditambah pada tahun depan dan kementerian akan memastikan kursus ditawarkan di UA yang lebih memerlukan pengalaman graduan untuk gelang pekerjaan, menggunakan konsep berkenaan.

**FC Undergraduate Programs**

- BCS (Software Engineering)
- BCS (Graphics & Multimedia Software)
- BCS (Comp Networks & Security)
- BCS (Bioinformatics)

**Bachelor of Computer Science (Data Engineering)**  
formerly known as BCS (Database Systems)



Faculty of Computing

UTM Razak School

Faculty of Science

Faculty of Built Environment

Faculty of Management

**2u2i @ UTM**

# Bachelor of Computer Science (Data Engineering)\*

## TALENT DATA PROFESSIONALS DEMAND

	DEMAND	
	2014	2020
Professionals*	4,088	16,000

### Talent Gap Study for the Communications Sector in Malaysia

### Occupations List (COL) 2015/2016

No.	Critical Occupation
22	Financial Analysts
23	Management and Organisation Analysts
	Personnel and Career Professionals
	Advertising and Marketing Professionals
	Systems Analysts
	Software Developers
	Applications Programmers
	Software and Application Developers and Analysts Not Elsewhere Classified
	Database Designers and Administrators
	System Administrators
	Computer Network Professionals
	Database and Network Professionals Not Elsewhere Classified
	Analysts
	Electronics Engineering Technicians
	Mechanical Engineering Technicians
	Environmental and Occupational Health Inspectors and Technicians
	Actuaries and Finance Dealers and Brokers
	Banking and Loans Officers
	Accounting Associate Professionals
	Insurance Underwriters
	Information and Communications Technology (ICT) User Support Technicians

	SMEs	MNCs	Network Operators & Service Providers
<b>Indicative Critical Job Roles</b>	<ul style="list-style-type: none"> <li>Network strategists</li> <li>Network engineers</li> <li>Network operations</li> </ul>	<ul style="list-style-type: none"> <li>Data scientists</li> <li>Solutions architect, programmers</li> <li>Data modellers</li> </ul>	<ul style="list-style-type: none"> <li>Network engineers and network strategist both in fixed line and wireless technology focus areas</li> </ul>
<b>Indicative Critical Technical Competencies</b>	<ul style="list-style-type: none"> <li>Network provisioning</li> <li>Systems integration</li> <li>Programme coding and configuration</li> <li>Optical fibre planning and installing</li> </ul>	<ul style="list-style-type: none"> <li>Data mining</li> <li>Customer analytics</li> <li>Predictive analytics</li> </ul>	<ul style="list-style-type: none"> <li>Network engineer which possess skill sets involving a combination of network knowledge, IT skills and entrepreneurial skills</li> </ul>

Top 5 indicative critical job roles that are difficult to hire:

1. Network strategist
2. Wireless network engineer
3. Network designer
4. Data mining analyst
5. Network security engineer

Top 5 indicative critical technical competencies in the next 3-5 years are:

1. Core network design and planning
2. Technology and solution evaluation
3. Network function virtualisation
4. Network security
5. Data mining



Lahirkan graduan, ahli profesional menerusi ICT  
25 NOVEMBER 2014

"Dalam satu kajian yang dilakukan pada akhir tahun lepas, perkhidmatan rangkaian sosial berorientasikan perniagaan, LinkedIn, mendapati lima jenis kemahiran paling hangat di pasaran kerja termasuk media sosial, pemasaran, pembangunan mudah alih, 'cloud computing' dan data perlombongan dan analisis.

"Berhubung perkara ini, kita perlu bertindak - kerajaan dan pembuat dasar. Bagaimana kita memastikan bahawa pasaran kerja mempunyai bekalan pekerja yang mencukupi dengan kemahiran-kemahiran itu," katanya. - Bernama

# Malaysia needs additional 12,000 data scientists: Idris Jusoh

Posted on 3 September 2015 - 02:04pm  
Last updated on 3 September 2015 - 03:45pm



**PUTRAJAYA:** An additional 12,000 big data scientists are needed within the next five years to spur Malaysia's data-driven economy, said Higher Education Minister Datuk Seri Idris Jusoh (pix).

He said in 2014, there were 4,000 big data scientists in this country and the government was fully aware of the increase in demand for their services from the commercial and public sectors.

To address the shortage, he said the government has embarked on various initiatives, including establishing big data competency centres in institutions of higher learning nationwide.

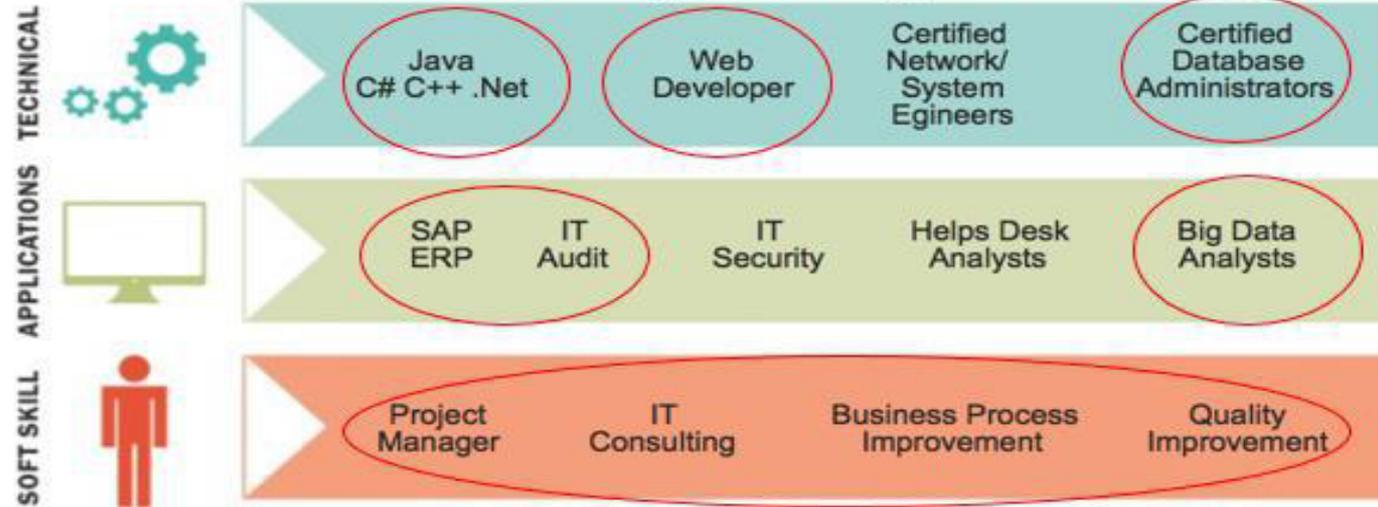
"Ultimately, we aspire to compete in data economy on a global scale," he said at the launch of the International Conference on Soft Computing in Data Science 2015 at the 2nd International Conference on Statistics in Science, Business and Engineering 2015 organised by Universiti Kebangsaan Malaysia.

BERNAMA

Bidang Ilmu	Teknologi Big Data
Sistem Maklumat	Aplikasi (Kepintaran business) dan Visualisasi
Matematik	Model Analisa (Prediktif atau Deskriptif)
Sistem Maklumat	Pangkalan Data
Sains Komputer	Sistem Operasi
Sains Komputer	Platform/Server

Teknologi Big Data	Kursus Ditawar
Aplikasi (Kepintaran Business)	Intelligent Decision Support System (Elektif Program)
	Application Development (Elektif)
	Enterprise System Design and Modelling (Elektif Program)
Model Analisa (Prediktif atau Deskriptif)	Data Structure and Algorithm (Teras)
	Probability & Statistical Data Analysis (Teras)
	Artificial Intelligence (Elektif)
Pangkalan Data	Data Mining (Elektif)
	Database (Teras)
	Database Programming (Elektif)
	Multimedia Data Modelling (Elektif)
Sistem Operasi	Information Retrieval (Elektif)
	Operating Systems (Teras)
Platform/Server	Network Communication (Teras)

## Hot ICT Jobs by Areas of Applications



ICT Job Market: Outlook in Malaysia, June 2015

ICT Jobs	Kursus Ditawar
Database Administrators	Database Administration (SCD3713)
	Database (SCD2523)
	Database Programming (SCD2623)
Big Data Analysts	Probability & Statistical Data Analysis (SCI2143)
	Data Mining (SCD3753)
	Intelligent Decision Support System (SCD4813)
SAP/ERP	Enterprise System Design & Modeling (SCD4743)
Business Process Improvement	
Web Developer	Web Programming (SCV1223)
	System Development Technology (SCD3723)
IT Security	Information Security & Data Recovery (SCD4833)

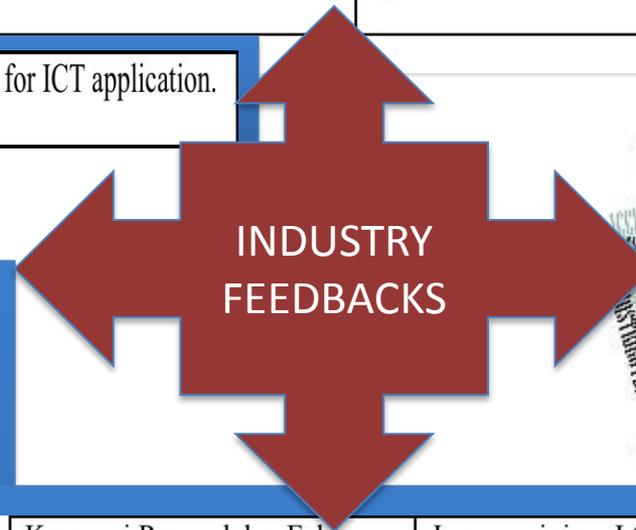


Increase Graduate Employability

71% graduates from the first cohort secured ICT related jobs before convo due to professional certifications

Pertronas Geo-Sample Centre

Database is fundamental or backbone for ICT application.



No	Components	1	2	3	4	5
1.	Managing and manipulating data is important to the industry?				5	10
2.	Knowledge in Database is important to IT company?				5	10
3.	Designing Information Systems requires good database skills				6	9
4.	Knowledge of database is required in Information System development			2	5	8
5.	Knowledge of database is fundamental to data analysis and data visualization			1	4	10
6.	Database skills is fundamental to big data management			1	2	12
7.	Graduate with high database skills gets better chance to secure a job in IT company		1	2	6	6
8.	Database field in system development is continuously needed in IT company			1	4	10

Koperasi Permodelan Felda Malaysia Berhad

In my opinion, I think database contribute a huge advantage for my company. For your information, our company just like bank. We handle investment, withdraw, deposit, ar-rahn and many more. So, our data need to be consistent in order to balance in balancing sheet for audit's session soon. As a IT Department, we need to solve all the problems regarding data loss. I am very proud to be database student because what I had learnt in Information System's module helping me a lot in growing up my company.

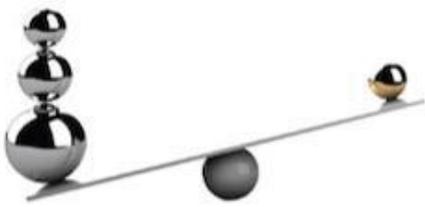
PERODUA HQ

For most company, whether we have knowledge about the language (coldfusion,C++,C#). we must have some knowledge about how to manage the data manage the database sql query,package,function ,procedure ,cursor as it is more crucial than the software itself. So i can say student that have knowledge about database make the student more versatile and have market value.



# Engagement with Industries





# COMPARISON

— Jobs in Data Science —



**Data Scientist**

These people use their analytical and technical capabilities to extract meaning insights from data.



**Data Engineer**

These people ensure uninterrupted flow of data between servers and applications. They are responsible for data architecture.



**Statistician**

These people understand statistics theoretically and apply them to real life problems.

## Data Scientist

vs

## Data Engineer

vs

## Statistician

### Responsibilities

Develop and plan required analytic projects in response to business needs.

Contribute to data mining architectures, modeling standards, reporting, and data analysis methodologies.

Collaborate with stakeholders to integrate data mining results with existing systems.

Monitor data mining system performance and implement efficiency improvements.

Design, construct, install, test and maintain highly scalable data management systems

Improve data foundational procedures, guidelines and standards

Integrate new data management technologies and software engineering tools into existing structures

Create custom software components (e.g. specialized UDFs) and analytics applications

Apply statistical theories and methods to solve practical problems of various industries

Determine methods for finding or collecting data

Design surveys or experiments or opinion polls to collect data

Analyze, interpret & undertake data analysis

Report conclusions from their analyses

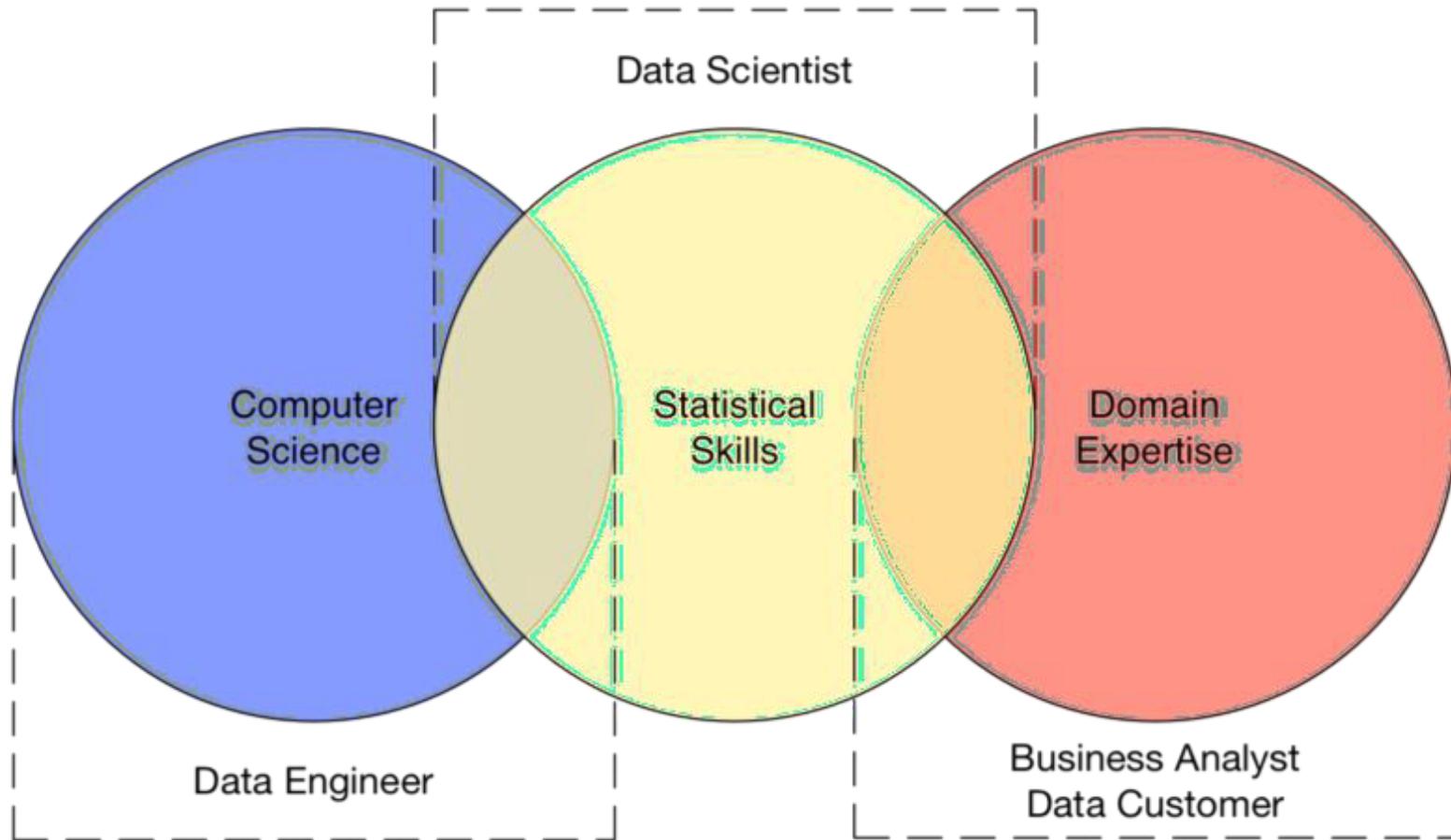
### Skills

Programming, Mathematics, Business Understanding, Statistics, Data Visualization, Machine Learning, Attention to detail

Database design, Production coding, Data collection, data warehousing, Data transformation, Work diligently with data

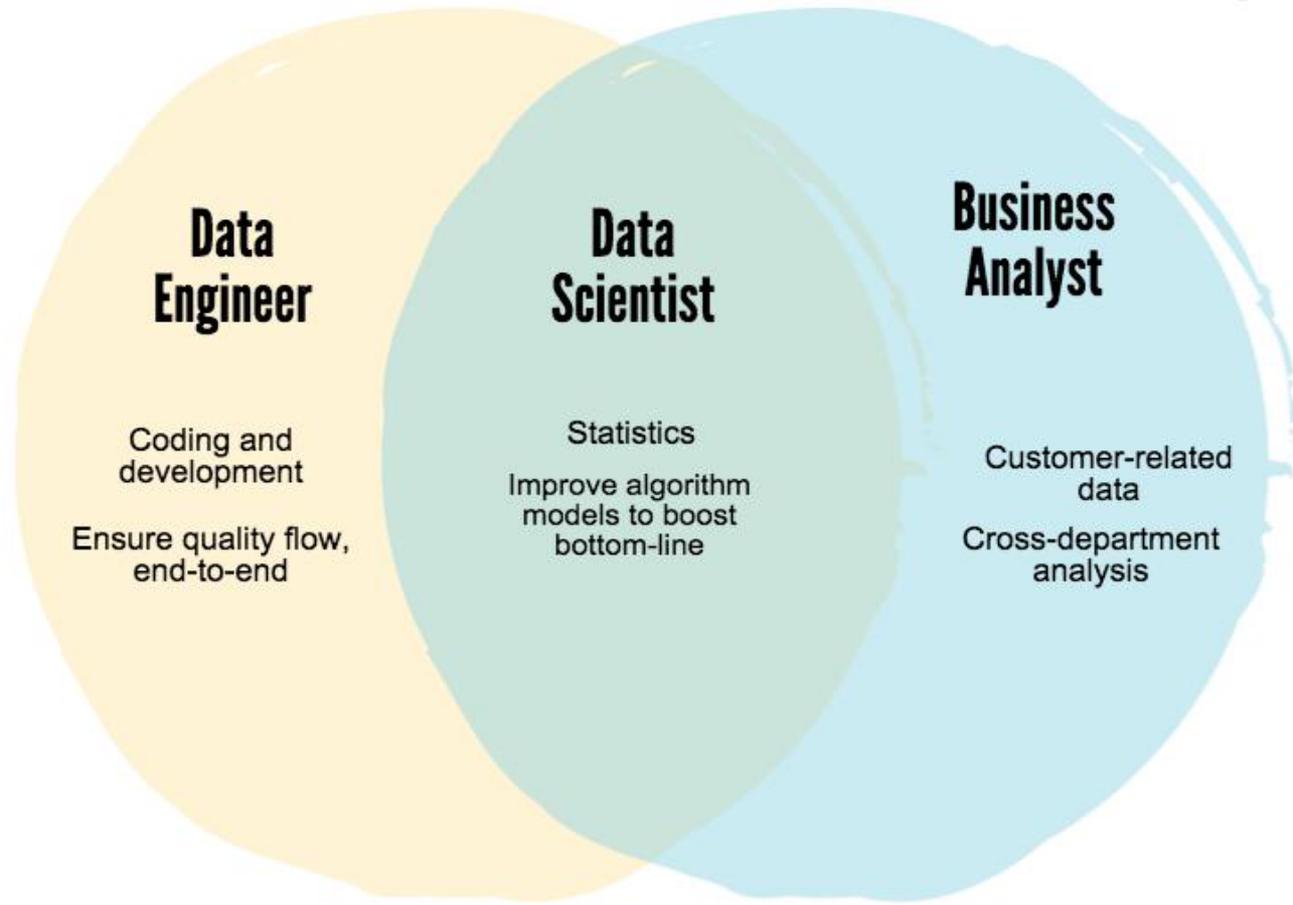
Technical and Analytics Skills, Mathematics, Operational Research, Writing skills, Ability to Analyze, Model and interpret data, Flair of explaining difficult concepts in simple manner

# Data Engineer vs Data Scientist vs Business Analyst



Source: <http://www.kevinschmidt.biz/2015/03/22/data-engineer-vs-data-scientist-vs-business-analyst/>

# Data Engineer vs Data Scientist vs Business Analyst



Ritika Trikha, The Biggest Misconception about Data Scientists

### **Business Analyst:**

Business analysts' strengths lie in their business acumen. They can communicate well with both the data scientist and C-suite to help drive data-driven decisions faster. They typically work across sales and marketing teams to make data-driven decisions. The best business analysts also have skills in statistics to be able to glean interesting insights from past behavior.

### **Data Engineer:**

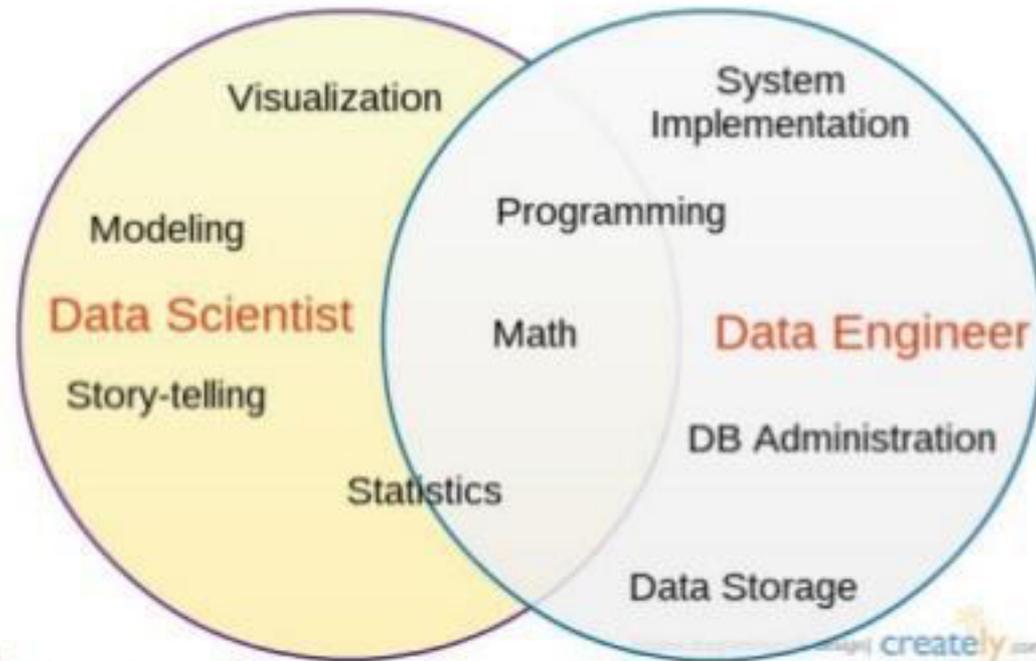
While data scientists dig into the research and visualization of data, data engineers ensure the data is powered and flows correctly through the pipeline. They're typically software engineers who can engineer a strong foundation for data scientists or analysts to think critically about the data.

### **Data Scientist:**

Data science is largely rooted in statistics, data modeling, analytics and algorithms. They focus on conducting research, asking open-ended questions and optimizing data to help companies get better at what they do. For instance, top-tiered data scientists are the minds behind recommended products on Amazon. Data mining (the most in-demand skill on LinkedIn) is a subset of data science as the means to the end of extracting value from data using techniques, like pattern recognition, algorithm design and clustering, to name a few, to better predict future behavior.

Ritika Trikha, The Biggest Misconception about Data Scientists

## Data Scientist vs. Data Engineer



**Data engineers** are the designers, builders and managers of the "big data" infrastructure. They develop the architecture that helps analyze and process data in the way the organization needs it. And they make sure those systems are performing smoothly



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## Data Science Teams

Data  
Analysts

- Strong data skills and the ability to use existing data analysis tools
- Able to communicate and tell a story using data

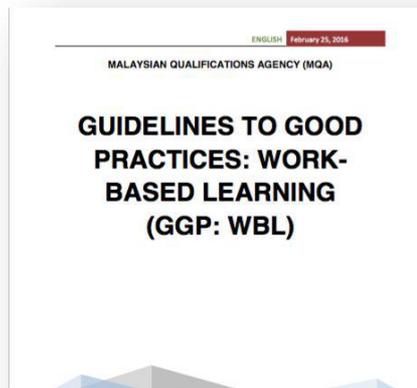
Data  
Engineers

- Usually a background in computer science or engineering
- Very good programming and DevOps skills

Data  
Scientists

- Strong math/stats background in addition to programming ability
- Understanding of machine learning algorithms

# 2u2i through Work-based Learning



## WBL Day Release

Classes or WBL experiences *can be conducted at the workplace* by either academic staff or qualified industry coach



Schedule hours or days within the course when the students are released to attend a credit earned WBL experience or to practice knowledge learned from educational courses with the industry

## WBL Block Release

Classes or WBL experiences *must be held at the workplace* that provide structure of WBL agreed by both University and Industry partner and conducted by qualified industry coaches and/or academic staff from University



Practical training at a workplace for a specified period (block) each year to undertake a structure skill practice with a selected industry partner for a block of time (eg. Full-time for 4 months)

## Work-based Learning Components (MQA Standard)

### Theory and Work

### Industrial Guidance

### Assessment Hours

Through work activities, students are expected to practice theories learned from previous or current semesters

Total number of hours allocated for courses guided, mentored and assessed by industry coach at the industry workplace

The total student learning hours allocated at the workplace (WBL) is inclusive of the assessment hours

Time calculated for theory is divided into 2 components; Dependent learning (DL) and Independent Learning (IL)

Eg. 8 hours X 5 days X 16 weeks of WBL programme = 640 hours

Recommended to include these components for SLT & credits calculation :

- Effective Learning Time (ELT)
- Credits



**Effective Learning Time = (Theory + Industrial Guidance + Assessment) x 80%**

Note : It is estimated that around 20% of the time at work cannot be determined as ELT.

**Credits = Effective Learning Time (ELT)/40 Malaysian Notional Hour (ELT/40)**

Example of SLT and credits calculation for *Editing and Composition Course*

The SLT for Theory component is learned outside of work (class). Using the formula, the credits for this subject :

16 (Dependent Learning) + 16 (Independent Learning) + 200 (Industrial Guidance) + 22.5 (Assessment Outside Work) = **254.5**  
**(254.5 x 80%)/40 = 5 credits**

## UTM Bachelor of Computer Science (Data Engineering) + Professional Certification\*

### Characteristics

Comply and above national (MQA) and international (ACM) standards

Structured Industry-Academia Collaboration

Work based Learning (WBL)

Design, delivery and assessment based on UTM New Academia Learning Innovation (NALI)

### Advantages

Balanced between theory and practice

Synergistic effort with smart partners

UTM Degree, Professional Cert, and Real Work Experience

High graduate employability

# The Curriculum

## UTM Bachelor of Computer Science (Data Engineering) + Professional Certification\*


**2u**
**1i \***
**1i**

**4-Year Course (128 credit hour)**

### 1st Year

- Technology & Information Systems (W)
- Programming Technique 1
- Digital Logic
- Discrete Structure
- Programming Technique 2
- Network Communication
- Probability & Statistics
- Operating Systems
- \* University Courses

### 2nd Year

- Databases
- System Analysis & Design
- Data Structure & Algorithm
- Computer Organization & Arch.
- Artificial Intelligence
- High Performance Data Processing
- Object-Oriented Programming
- Human Computer Interface
- Data Mining
- Information Retrieval
- Database Administration (W)
- Special Topics in Database (W)

### 3rd Year

- Software Engineering (W)
- Web Programming (W)
- Appl Development (W)
- Fundamentals of Technopreneurship (W)
- Technop Seminar (W)
- Innovation & Creativity (W)
- Database Programming (W)
- Business Intelligence (W)
- Mgmt Info Systems (W)
- MM Data Modelling (W)
- Enterprise Sys Design (W)
- Syst. Development Technology (W)

### 4th Year

- Professional Development & Practice (W)
- Professional Development & Practice Report (W)
- Industry Integrated Project (W)
- Industry Integrated Project Report (W)

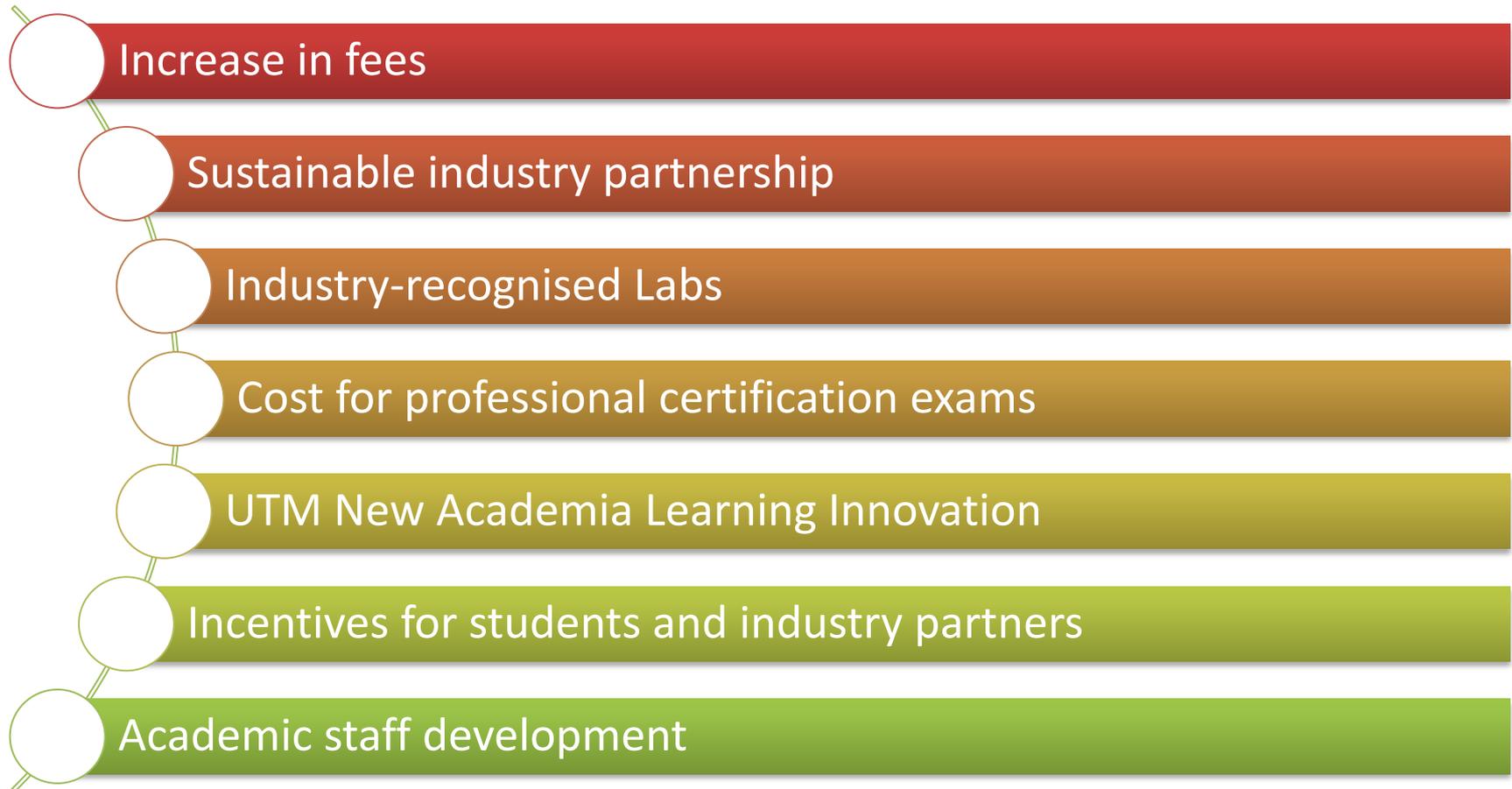
**Professional Certification**
**ORACLE®**

# Distribution of credits

Year	Total Credits	Conventional Approach		WBL Approach		
		Credits	Percentage	Mode	Credits	Percentage
1	36 (18 + 18)	33	92%	DR	3	8%
2	35 (17 + 18)	23	66%	DR	12	34%
3	33 (15 + 18)	0	0%	DR	33	100%
4	24 (12 + 12)	0	0%	BR	24	100%
Total Credits		<b>56</b>			<b>72</b>	
Percentage		<b>56/128 = 44%</b>			<b>72/128 = 56%</b>	

Mode: DR (Day Release); BR (Block Release)

# Issues and Challenges

- 
- Increase in fees
  - Sustainable industry partnership
  - Industry-recognised Labs
  - Cost for professional certification exams
  - UTM New Academia Learning Innovation
  - Incentives for students and industry partners
  - Academic staff development

# Possible Terms of Collaboration (MDEC & i2m)

- Provide advice and assistance in the design of the curriculum;
- Bridge the faculty with industries for UTM students attending day-release (short-period) and/or block-release (long-period) programs;
- Facilitate UTM in establishing Teaching and Learning Laboratories including hardware equipment, software and training materials for education purposes;
- Provide incentives for academic staff and students to attend professional certification trainings and examinations;
- Assist UTM graduates in seeking jobs or becoming entrepreneurs;
- Provide constructive feedbacks for continuous quality improvement of 2u2i curriculum;

# Possible Terms of Collaboration (Industry Partners)

- Provide advice and assistance in the design of the curriculum;
- Provide placements for UTM students for attending day-release and/or block-release programs;
- Host academic visits for the enhancement of teaching and learning;
- Expose students with the latest related methodologies and technologies;
- Provide students with real tasks for experiential learning;
- Provide student with basic working space, necessary resources and support services;
- Assess students' performance and provide report and feedbacks to the faculty;
- (Optionally) provide allowance while they are in industry;
- Provide constructive feedbacks for continuous quality improvement of 2u2i curriculum;

# Current Graduate Employability Programmes



- Oracle Training and Certifications (in collaboration with VTC)

- Microsoft Certified Technology Specialist: Microsoft Project 2013
- Oracle Database 11g Administrator Certified Associate
- Certified Ethical Hacker
- Embedded System Design- ARM Controller
- AutoCAD Certified Associate
- Revit Architecture Certified Associate
- Autodesk Maya Certified Associate (MAYA)
- Huawei Certified Datacom Associate



# From GGP:WBL

- Benefits of WBL for students:
  - STUDENTS have the opportunity to:
    - i. foster learning autonomy, self-development, self-appraisal, and synthesise theory with practice by developing skills of critical reflection;
    - ii. develop specialist knowledge, theory and skills by using the workplace as a context for project-based or practice evidenced learning;
    - iii. obtain an understanding of employment opportunities and responsibilities through direct on-the-job experience;
    - iv. achieve a positive attitude toward work and co-workers as well as improve interpersonal skills resulting from WBL with experienced workers;
    - v. learn, both in class and on-the-job, through significant workplace experiences and able to link academic study and theory to real industrial practice;
    - vi. acquire attitudes, skills and knowledge necessary for success in chosen career;
    - vii. develop a greater sense of responsibility and work habits necessary for individual maturity and job competency;
    - viii. develop employability skills and knowledge that are better taught in the work setting, with minimal loss of personal time or workplace time;

# From GGP:WBL

- Benefits of WBL for students:
  - STUDENTS have the opportunity to:
    - ix. obtain WBL that can lead to full-time employment for the students after graduation;
    - x. enter the full-time employment market with work experience, thus enhancing chances of success and advancement;
    - xi. enhance professional development and future career paths; and
    - xii. Engender ethical understanding and promote ethically aware practice at individual and
    - xiii. corporate levels.
    - xiv. aid progression for students after graduation; and
    - xv. be assisted in clarifying career goals and provided a practical means of reaching them

# From GGP:WBL

- Benefits of WBL for higher education providers (HEP) :
  - HEPs have the opportunity to:
    - i. allow utilisation of community resources to expand the curriculum and provide individualised instruction;
    - ii. enrich the curriculum by providing school-to-work experiences needed in the effective preparation of specific career major goals;
    - iii. improve a means of evaluating the efficiency and success of the curriculum;
    - iv. enable HEP personnel to stay up-to-date on constantly changing industry's procedures and practices; thus, course content can be updated accordingly;
    - v. use the facilities of cooperating organisations in the community as a laboratory for practical WBL;
    - vi. enable a stronger school-to-work system to be developed by combining the efforts of employers and HEP personnel in WBL;
    - vii. further maintain a close relationship between school and community;

# From GGP:WBL

- Benefits of WBL for industries or employers :
  - INDUSTRIES or EMPLOYERS have the opportunity to:
    - i. bring in fresh enthusiasm and new ideas to the organisations through students;
    - ii. have a good way to test a potential new recruit which will lead to a cost effective solution to an organisation's recruitment needs;
    - iii. meet skills shortages and able to grow the organisation's workforce;
    - iv. have direct links to further qualifications and continuing professional development for their employees;
    - v. create a pool of skilled and motivated potential employees with the ability to adapt to an ever-changing, global job market;
    - vi. reduce future recruiting/training/ cost for new employees;
    - vii. increase employee morale, motivation and retention; and
    - viii. improve the public image of the industries/employers through participation in a community
    - ix. endeavour to prepare people for occupation and adult citizenship.
    - x. be furnished with an excellent method of giving students a better understanding of the elements to good human relations in the work environment; and
    - xi. achieve graduates' employability targets.

# From GGP:WBL

- WBL Key Player :
  - Roles and responsibilities of industry coach:
    - i. provide training and development to WBL students according to specific programme/course curriculum to meet students' learning outcomes;
    - ii. establish positive relationships with students; guiding, mentoring and supporting the students through the WBL;
    - iii. provide problem solving and follow-up activities to facilitate on-going business and industry participation in WBL;
    - iv. assist in developing WBL instructional manual for teaching and learning;
    - v. ensure safety and health provisions are being adhered at the workplace as per required by legislation;
    - vi. monitor and assess WBL students' progress and attainment;
    - vii. maintain regular communication and report any concerns observed to WBL tutor and coordinator to ensure smooth implementation of WBL;
    - viii. assist tutor and coordinator in diagnosing curricular weaknesses through interim assessment;
    - ix. assist and counsel students in familiarising with the working environment;
    - x. provide career counselling support to students within the scope of their interest and programme placement; and
    - xi. participate in coaching training and professional development.

# From GGP:WBL

- WBL Key Player :
  - Roles and responsibilities of the students:
    - i. achieve programme/course learning outcomes;
    - ii. attend all briefing session, teaching and learning activities, assessment activities conducted by HEP and industry;
    - iii. adhere to rules and regulations of HEP/industry;
    - iv. establish positive relationship with peers and superiors at the workplace;
    - v. submit all assignments, reports, etc. within time given;
    - vi. provide inputs and feedback to tutor/coach for CQI of WBL;
    - vii. be fully responsible towards HEP/industry;
    - viii. follow the occupational safety and health provisions as per required by the industry;
    - ix. comply with the business secrecy/intellectual property/product innovation; and
    - x. maintain a record of their hours of work by updating weekly.