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UTeM

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

KURSUS KAEDAH PENGAJARAN BERORENTASIKAN PRAKTIKAL / TVET

2. REKABENTUK KURIKULUM DAN PENYAMPAIAN PROGRAM TVET



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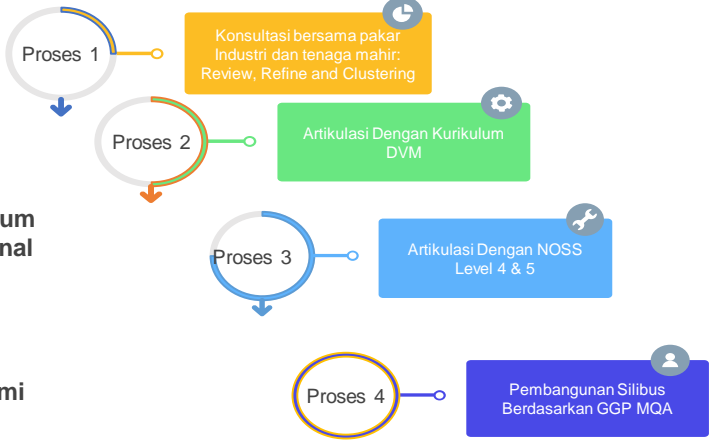


Pembangunan Kurikulum BTech

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Proses Pembangunan

- ✓ Rangka kerja pembangunan kurikulum menggunakan National Occupational Skills Standards (NOSS) sebagai rujukan
- ✓ Kursus-kursus yang ditawarkan merangkumi job competency yang berkaitan dengan bidang pekerjaan berkaitan



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graph TD
    P1((Proses 1)) --> P2((Proses 2))
    P2 --> P3((Proses 3))
    P3 --> P4((Proses 4))
    P1 --- B1[Konsultasi bersama pakar Industri dan tenaga mahir: Review, Refine and Clustering]
    P2 --- B2[Artikulasi Dengan Kurikulum DVM]
    P3 --- B3[Artikulasi Dengan NOSS Level 4 & 5]
    P4 --- B4[Pembangunan Silibus Berdasarkan GGP MQA]
          
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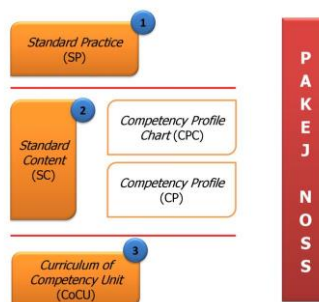
PEMBANGUNAN KURIKULUM PROGRAM TVET: NOSS

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JABATAN PEMBANGUNAN KEMAHIRAN
KEMENTERIAN SUMBER MANUSIA

**NOSS: NATIONAL OCCUPATIONAL
SKILLS STANDARDS**



JABATAN PEMBANGUNAN KEMAHIRAN
KEMENTERIAN SUMBER MANUSIA

**DESCUM: DEVELOPMENT STANDARD
AND CURRICULUM**

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PEMBANGUNAN KURIKULUM PROGRAM TVET

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OCCUPATIONAL STRUCTURES

SECTOR	CHEMICAL		BIOTECHNOLOGY
SUB SECTOR	CHEMICAL ANALYSIS	FORENSIC SCIENCE	BIOLOGY
AREA	Analytical Chemistry	Document Examination	Molecular Biology
LEVEL			
LEVEL 5	Chemical Laboratory Executive	Document Examination Executive	Molecular Biology Laboratory Executive
LEVEL 4	Chemical Laboratory Assistant Executive	Document Examination Assistant Executive	Molecular Biology Laboratory Assistant Executive
LEVEL 3	Chemical Laboratory Senior Assistant	Document Examination Senior Laboratory Assistant	Molecular Biology Senior Laboratory Technician
LEVEL 2	Chemical Laboratory Assistant	Document Examination Laboratory Assistant	Molecular Biology Laboratory Technician
LEVEL 1	NIL	NIL	NIL

OCCUPATIONAL STRUCTURE (OS)

Sector: Chemical

Sub sector: Forensic Science

Job Area: Document Examination

Level 2: Forensic Document Examination Laboratory Assistant

EXAMPLE OF OS

OCCUPATIONAL AREA STRUCTURES

SECTOR	CHEMICAL		BIOTECHNOLOGY
SUB SECTOR	CHEMICAL ANALYSIS	FORENSIC SCIENCE	BIOLOGY
AREA	Analytical Chemistry	Document Examination	Molecular Biology
LEVEL			
LEVEL 5	Chemical Laboratory Management	Document Examination Laboratory Management	Molecular Biology Laboratory Management
LEVEL 4	Chemical Laboratory Supervision	Document Examination Laboratory Supervision	Molecular Biology Laboratory Supervision
LEVEL 3	Chemical Laboratory Operation	Document Examination Laboratory Operation	Molecular Biology Laboratory Operation
LEVEL 2	Chemical Laboratory Operation	Document Examination Laboratory Operation	Molecular Biology Laboratory Operation
LEVEL 1	NIL	NIL	NIL

OCCUPATIONAL AREA STRUCTURE (OAS)

Sector: Chemical

Sub sector: Forensic Science

Job Area: Document Examination

Level 2: Forensic Document Examination Laboratory Assistant

EXAMPLE OF OAS

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2. WHAT IS IN STANDARD CONTENT (SC)

COMPETENCY PROFILE CHART (CPC)

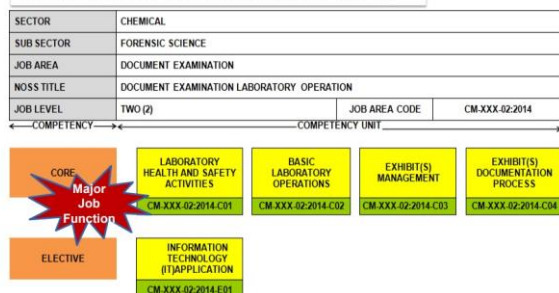


Figure 2.2: Competency profile chart for Forensic Document Examination Laboratory Assistant Level 2.

COMPETENCY PROFILE (CP)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Indicators
1. LABORATORY HEALTH AND SAFETY ACTIVITIES	CM.XXX-02-2014-C01	The Health and Safety Activities, describes the requirement to maintain and ensure the safety of laboratory personnel and equipment. The serviceability of the equipment and lab personnel are vital to ensure laboratory safety and health of the personnel.	1. Handle Chemical Materials	1.1 Common chemical material is distinguished based on classes according to Material Safety Data Sheet (MSDS). 1.2 Common chemical materials are categorized based on the application. 1.3 Types of chemical are used according to analytical SOP. 1.4 Amount of chemical is measured and used according to analytical SOP.
		The person who is competent in the Basic Laboratory Analysis shall be able to handle chemical materials, implement OSHA rules and regulations and handle electrical, mechanical and scientific instrument, handle radioactive instrument and bio-hazard exhibits.	2. Implement OSHA rules and regulations.	2.1 Chemical materials are clearly labelled and stored according to standard guideline. 2.2 Hazardous chemicals classes are identified according to standard guideline. 2.3 Permissible exposure limits of chemical materials is determined according to MSDS. 2.4 Laboratory waste is disposed according to Department of Environmental (DOE) specification. 2.5 Proper laboratory environment condition is monitored and maintained according to standard guideline. 2.6 Laboratory risk management system is implemented, reviewed and improved according to standard guideline.
		The person who is competent in this CU shall be able to handle all laboratory equipment and chemical materials in accordance with the standards and recommended practices.	3. Handle electrical instrument	3.1 Potential risk from electrical instruments are identified. 3.2 Electrical instruments are operated

PEMBANGUNAN KURIKULUM PROGRAM TVET

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ARTIKULASI TERHADAP PROGRAM DVM DAN NOSS

Sarjana Muda Teknologi Penyelenggaraan Sistem Elektrik Dengan Kepujian			TAHAP	KOD MSIC	
PROGRAM JPK					
379	EE-210-4	PENOLONG PEREKABENTUK TEKNOLOGI SOLAR	4	F	F432
380	EE-210-5	PEREKABENTUK TEKNOLOGI SOLAR	5	F	F432
388	EE-213-4-2014	REKABENTUK & PENGOPTIMUMAN SISTEM PV SOLAR	4	C	C281
389	EE-213-5-2014	PENGURUSAN SISTEM PV SOLAR	5	C	C281
395	EE-230-4-2013	INSTRUMENTASI PERINDUSTRIAN & SISTEM KAWALAN- PENYELIAAN & KAWALAN	4	C	C265
396	EE-230-5-2013	INSTRUMENTASI PERINDUSTRIAN & SISTEM-PERANCANGAN & PENGURUSAN TEKNIKAL	5	C	C265
404	EE-320-4-2012	PEMASANGAN & PENYELENGGARAAN ELEKTRIK VOLTAN RENDAH	4	F	F432
405	EE-320-5-2012	PEMASANGAN & PENYELENGGARAAN ELEKTRIK VOLTAN TINGGI	5	F	F432
904	MCE4	PENGURUS MEKANIKA & ELEKTRIK	4	F	F410
906	ME-010-4-2013	KEJURUTERAAN PENYELENGGARAAN MESIN INDUSTRI	4	C	C331
907	ME-010-5-2013	KEJURUTERAAN PENYELENGGARAAN MESIN INDUSTRI	5	C	C331
917	ME-030-4-2015	BUILDING MANAGEMENT SYSTEM & ENERGY OPTIMISATION	4	N	N811
918	ME-030-5-2015	BUILDING MANAGEMENT SYSTEM & ENERGY MANAGEMENT	5	N	N811
335	EE-320-4-2012	LOW VOLTAGE ELECTRICAL INSTALLATION & MAINTENANCE	4	EE	EE-320
493	EE-230-4-2013	INDUSTRIAL INSTRUMENTATION & CONTROL SYSTEM-MONITORING AND CONTROLLING	4	EE	EE-230
494	EE-230-5-2013	INDUSTRIAL INSTRUMENTATION & SYSTEM- PLANNING AND TECHNICAL MANAGEMENT	5	EE	EE-230

PEMBANGUNAN KURIKULUM PROGRAM TVET

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ARTIKULASI TERHADAP PROGRAM DVM DAN NOSS

KOD NOSS	NOSS	TAHAP	KOD MSIC	
EE-021-4.2012	PEMBANGUNAN PRODUK ELEKTRONIK	4	C	C261
EE-021-5.2012	REKABENTUK & PENGURUSAN PRODUK ELEKTRONIK	5	C	C261
EE-112-4	PAKAR REKABENTUK SISTEM ELEKTRONIK	4	C	C261
EE-112-5	PAKAR KANAN REKABENTUK SISTEM ELEKTRONIK	5	C	C261
EE-113-4	PAKAR REKABENTUK LITAR BERSEPADU	4	C	C261
EE-113-5	PAKAR KANAN REKABENTUK LITAR BERSEPADU	5	C	C261
EE-120-4	PENOLONG SPESIALIS REKABENTUK ELEKTRONIK PENGGUNA	4	C	C264
EE-120-5	SPESIALIS REKABENTUK ELEKTRONIK PENGGUNA	5	C	C264
EE-230-4.2013	INSTRUMENTASI PERINDUSTRIAN & SISTEM KAWALAN- PENYELIAAN & KAWALAN	4	C	C265
EE-230-5.2013	INSTRUMENTASI PERINDUSTRIAN & SISTEMPERANCANGAN & PENGURUSAN TEKNIKAL	5	C	C265
MC-091-4.2016	INDUSTRIAL AUTOMATION SYSTEMS SUPPORT	4	C	C332
MC-091-5.2016	INDUSTRIAL AUTOMATION SYSTEMS DEVELOPMENT	5	C	C332

PEMBANGUNAN KURIKULUM PROGRAM TVET

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SAMPLE KURIKULUM BTECH

The Curriculum Structure for Program BACHELOR TECHNOLOGY OF ELECTRICAL MAINTENANCE SYSTEM (BEM)

The Curriculum Structure for Program Document 1, Certificate of Completion, Certificate of Competency																									
Components	Y1 S1		Cr	Y1 S2		Cr	Y2 S1		Cr	Y2 S2		Cr	Y3 S1		Cr	Y3 S2		Cr	Y3 S3		Cr	Y4 S1		Cr	Total Cr
	Code	Course		Code	Course		Code	Course		Code	Course		Code	Course		Code	Course		Code	Course		Code	Course		
University Compulsory (U)	BLHW 1442	English for Academic Purpose	2	BLHW 2452	Academic Writing	2	BLHW 2772	Appreciation of Ethics and Civilities	2	BLHW 3452	English For Professional Interaction	2													14
	BLHW 1762	Philosophy and Current Issues	2	BLHL 1212	Third Language	2	BKMC 1831	Co-Curriculum 2	1																
	BTMJ1112	Basic Entrepreneurship	2	BKCM 1561	Co-Curriculum 1	1																			
General Core (G)																									
Program Core (K)	BEEM 1114	Electrical System Drafting and Simulation	4	BEEM 1245	Solar PV Installation and Maintenance	5	BEEM 2375	Building Electrical System Maintenance	5	BEEM 2405	Electrical Machine & Drive System Integration	5	BEEM 3535	Industrial Machinery Control System Design	5	BEEM 3648	Maintenance Management System (MMS)	4	BEEM 3690	Final Year Project 1	6	BEEM 4112	Industrial Training	12	
	BEEM 1124	Technical Reporting	4	BEEM 1255	Batch-based Maintenance and Calibration	5	BEEM 2385	Renewable Energy System Maintenance	5	BEEM 2415	Energy efficiency Optimization	5	BEEM 3545	Monitoring system Integration	5	BEEM 3678	Project Planning and Execution	4							10
	BEEM 1135	Electrical System Measurement & Testing	5	BEEM 1263	Professional Practices	3	BEEM 2395	Generator System Maintenance	5	BEEM 2423	Certifiability Interaction and Management	3	BEEM 3554	Industrial Data Analysis	4	BEEM 3688	Final Year Project 2	4							
											BTMJ 2124	Capstone Technopreneur 1	4	BTMJ 3134	Capstone Technopreneur 2	4									
Electives (E)																									
Total Cr.			19			18			18			19			18			12			6			12	12

RUMUSAN PEMBANGUNAN KURIKULUM

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PEMBANGUNAN KURIKULUM PERLU MEMENUHI:

No.	Keperluan
1.	melibatkan jawatankuasa yang diwakili pihak berkepentingan terdiri daripada ahli akademik, wakil industri, badan profesional berkaitan, majikan dan pihak lain yang berkaitan.
2.	mematuhi domain hasil pembelajaran Kerangka Kelayakan Malaysia (Malaysian Qualifications Framework – MQF) dan/atau HPP
3.	mematuhi standard program Agensi Kelayakan Malaysia (Malaysian Qualifications Agency – MQA) berkaitan dan/atau keperluan badan profesional dan badan akreditasi
4.	mengenal pasti kursus dan kemahiran yang sesuai untuk dilaksanakan bagi komponen industri
5.	melibatkan pihak industri dalam pembangunan kurikulum.



KRITERIA UTAMA PEMBANGUNAN KURIKULUM

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PEMBANGUNAN KURIKULUM PERLU MEMENUHI:



KRITERIA KURIKULUM

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KRITERIA KURIKULUM MERANGKUMI

No.	Kriteria
1.	memenuhi syarat standard program yang spesifik dan/atau keperluan badan profesional;
2.	mempunyai komponen industri sekurang-kurangnya satu (1) tahun tempoh pengajian dan maksimum dua (2) tahun
3.	semester akhir pengajian mestilah di industri
4.	kursus Latihan Industri dijalankan pada semester akhir
5.	kursus komponen industri mestilah terdiri daripada Kursus Teras program pengajian dan/atau Elektif Teras program pengajian
6.	kursus komponen industri mestilah sebahagian daripada kurikulum program pengajian
7.	kursus komponen industri mestilah diberi nilai gred yang menyumbang kepada Purata Nilai Gred (PNG) dan Purata Nilai Gred Kumulatif (PNGK)
8.	jam kredit kursus komponen industri mestilah dikira sebagai jam kredit bergraduat

PENYAMPAIAN KURIKULUM

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Antara Kaedah/Teknik Penyampaian di IPT yang berasaskan Amalan Pembelajaran Berimpak Tinggi yang boleh digunakan:

No.	Kaedah/Teknik
1.	kerja lapangan yang dipacu industri dalam bidang yang berkaitan
2.	pembelajaran berasaskan masalah yang dibangunkan secara bersama dengan rakan industri
3.	kajian kes yang dibangunkan bersama industri yang berkaitan
4.	kajian kes yang dibangunkan bersama industri yang berkaitan
5.	kerja kursus dan projek berkumpulan yang dilaksanakan secara kolaboratif
6.	seminar tahun pertama
7.	pembelajaran berasaskan komuniti

Kaedah/Teknik Penyampaian di Industri

menggunakan pendekatan pelepasan secara blok (block release) di mana keseluruhan semester pengajian adalah di industri

No.	Kaedah/Teknik
1.	Pembelajaran Teradun (Blended Learning) :kuliah secara bersemuka dapat digantikan dengan bahan kandungan yang telah dimuat naik secara digital melalui 'e-learning platform' IPT masing-masing
2.	Pembelajaran Teori Berarahan Kerja (PTBK): melibatkan pembelajaran aktif secara berkumpulan, demonstrasi, projek, seminar dan amali di industri.
3.	Pembelajaran Berasaskan Masalah (PBM) : satu pendekatan pembelajaran bersandarkan penyelesaian masalah industri yang diberikan oleh pensyarah/Jurulatih Industri kepada pelajar untuk diselesaikan di industri
4.	Pembelajaran Berasaskan Projek (PBP): untuk menyokong penguasaan pengetahuan asas bersepadu yang pelajar boleh memanfaatkan dan gunakan dalam penganalisan dan penyelesaian masalah.
5.	Projek Capstone: Pengalaman di tahun akhir ini dimanifestasikan dalam bentuk projek akademik yang kebiasaannya dilaksanakan secara kolaboratif, disertasi serta projek akhir yang dilakukan di industri.

Thank You

