

**INISIATIF KUMPULAN FOKUS KHAS  
KEJURUTERAAN DAN SENI BINA**

*PANDUAN*

**AUDIT  
AKREDITASI**

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**BIDANG KEJURUTERAAN & SENI BINA**

**EDISI KEMASKINI 2025**

**UNIVERSITI AWAM**

*PANDUAN*

# AUDIT AKREDITASI

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BIDANG KEJURUTERAAN & SENI BINA

KUMPULAN FOKUS KHAS  
KEJURUTERAAN DAN SENI BINA  
UNIVERSITI AWAM

2025

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2. Libraries

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# **KATA PENGANTAR Pengerusi MAJLIS KETUA PUSTAKAWAN UNIVERSITI AWAM**

Assalamualaikum Warahmatullahi Wabarakatuh dan Salam Sejahtera.

Alhamdulillah, puji syukur kehadiran Allah SWT yang telah memberikan rahmat dan inayah-Nya sehingga kita dapat menerbitkan satu garis panduan yang berjudul Panduan Audit Akreditasi Bidang Kejuruteraan & Seni Bina melalui usaha dan inisiatif Kumpulan Fokus Khas Kejuruteraan dan Seni Bina.

Panduan Audit Akreditasi Bidang Kejuruteraan & Seni Bina merupakan satu inisiatif penerbitan panduan khusus bagi memenuhi keperluan Audit Akreditasi Perpustakaan Kejuruteraan dan Seni Bina Universiti Awam oleh Badan Akreditasi dalam bidang profesional yang berkaitan. Ianya sangat penting bagi memastikan mutu dan kualiti program akademik berkaitan kejuruteraan dan seni bina terutama melibatkan keperluan mandatori akreditasi di perpustakaan universiti awam.

Adalah menjadi harapan kami, garis panduan ini akan dapat membantu semua perpustakaan universiti awam yang mempunyai program akademik berkaitan kejuruteraan dan seni bina membangunkan kemudahan, sumber rujukan dan keperluan khusus yang menjadi syarat utama kepada pematuhan keperluan audit akreditasi berkaitan. Malah usaha ini dapat meningkatkan kolaborasi utuh di kalangan Perpustakaan Universiti Awam dalam meningkatkan mutu penyampaian perkhidmatan perpustakaan yang efektif, cekap dan tangkas.

Bagi pihak Majlis Ketua Pustakawan Universiti Awam (MKPUA), penghargaan jutaan terima kasih kepada semua ahli Kumpulan Fokus Khas Kejuruteraan dan Seni bina yang diterajui oleh Ketua Pustakawan Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA) yang terlibat dalam penyediaan garis panduan ini. Semoga segala usaha kalian bermanfaat dan diberi ganjaran oleh Allah SWT. Penghargaan juga ditujukan kepada semua Ketua Pustakawan Universiti Awam yang memberikan sokongan dan dokongan dalam pelbagai bentuk, secara langsung atau tidak langsung dalam pembangunan garis panduan ini.

Sekian Terima kasih.

TN. HJ. AZMAN BIN HASHIM  
Pengerusi Majlis Ketua Pustakawan Universiti Awam (2022 – 2024)

# PENGHARGAAN KEPADA AHLI KUMPULAN FOKUS KHAS KEJURUTERAAN DAN SENI BINA

2018

**Puan Adida Mohd Amin**  
Universiti Malaya (UM)

**Encik Ahmad Nazri Jaafar**  
Universiti Teknologi MARA (UiTM)

**Cik Aini Yusof**  
Universiti Sains Malaysia (USM)

**Puan Arinawati Ayob**  
Universiti Sains Malaysia (USM)

**Encik Arman Mohammad**  
Universiti Teknikal Malaysia Melaka (UTeM)

**Encik Aziz Tuah**  
Universiti Malaysia Sarawak (UNIMAS)

**Cik Azean Edawati Hj Zakaria**  
Universiti Putra Malaysia (UPM)

**Puan Hanani Fauzi**  
Universiti Malaya (UM)

**Cik Kamariah Gono**  
Universiti Malaysia Pahang (UMP)

**Puan Marhaniza Abdul Halim**  
Universiti Sains Islam Malaysia (USIM)

**Puan Mazmin Mat Akhir**  
Universiti Malaysia Perlis (UniMAP)

**Encik Mohammad Asmawi Abd Rahman**  
Universiti Malaysia Terengganu (UMT)

**Encik Md Sazali Md Salleh**  
Universiti Malaysia Sabah (UMS)

**Encik Mohd Najib Abdullah**  
Universiti Pertahanan Nasional Malaysia (UPNM)

**Puan Nik Masriza Zakaria**  
Universiti Teknologi Malaysia (UTM)

**Puan Noor Hayati Abu Kassim**  
Universiti Teknologi MARA (UiTM)

**Puan Norbaya Muda**  
Universiti Islam Antarabangsa Malaysia (UIAM)

**Encik Shahrul Ahmad Bakri**  
Universiti Tun Hussein Onn Malaysia (UTHM)

**Puan Samsida Samsudin**  
Universiti Putra Malaysia (UPM)

**Puan Siti Azizah Md Nor**  
Universiti Islam Antarabangsa Malaysia (UIAM)

**Puan Zaidah Sulaiman**  
Universiti Kebangsaan Malaysia (UKM)

**Cik Rohaida Mohamad Idaris**  
Universiti Malaysia Pahang (UMP)

2025

**Cik Kamariah Gono**  
Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA)

**Puan Radia Banu Jan Mohamad**  
Universiti Sains Malaysia (USM)

**Puan Sukmawati Muhamad**  
Universiti Sains Malaysia (USM)

**Puan Nik Masriza Zakaria**  
Universiti Teknologi Malaysia (UTM)

**Puan Najwani Amir Sariffudin**  
Universiti Putra Malaysia (UPM)

**Puan Siti Khairiah Yusof**  
Universiti Putra Malaysia (UPM)

**Cik Ulya Sujak**  
Universiti Malaya (UM)

**Puan Asiah Mohamad**  
Universiti Kebangsaan Malaysia (UKM)

**Puan Norhamimi Othman**  
Universiti Teknologi MARA (UiTM)

**Puan Hanani Rojikin**  
Universiti Teknologi MARA (UiTM)

**Encik Faizal Hazri Mat Ripin**  
Universiti Islam Antarabangsa Malaysia (UIAM)

**Puan Engku Norulizati Engku Aziz**  
Universiti Islam Antarabangsa Malaysia (UIAM)

**Encik Aziz Tuah**  
Universiti Malaysia Sarawak (UNIMAS)

**Puan Norjuriah Ramli**  
Universiti Malaysia Sarawak (UNIMAS)

**Puan Lorita Gadol**  
Universiti Malaysia Sabah (UMS)

**Encik Md. Nizam Azid**  
Universiti Malaysia Perlis (UNIMAP)

**Encik Khairul Anuar Zainudin**  
Universiti Pertahanan Nasional Malaysia (UPNM)

**Puan Affida Abu Bakar**  
Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA)

**Puan Aishahatun Abdul Majid**  
Universiti Sains Islam Malaysia (USIM)

**Puan Nor Ilyah Binti Othman**  
Universiti Teknikal Malaysia Melaka (UTeM)

**Puan Noor Hazwani Waginoh**  
Universiti Tun Hussein Onn Malaysia (UTHM)

**Puan Norashikin Johari**  
Universiti Tun Hussein Onn Malaysia (UTHM)

**Encik Mohammad Asmawi Abd Rahman**  
Universiti Malaysia Terengganu (UMT)

## **GLOSARI**

### **Lembaga Akreditasi Profesional**

Lembaga Akreditasi Profesional merupakan badan yang bertanggungjawab mengiktiraf program universiti bagi program-program berkaitan seperti Kejuruteraan (*Institution of Engineers Malaysia*), Senibina (*Board of Architecture*) dan lain-lain.

### **Program**

Program merupakan susunan modul yang distruktur untuk suatu tempoh tertentu dan peringkat pembelajaran, bertujuan mencapai hasil pembelajaran yang telah ditentukan dan yang lazimnya menjurus kepada penganugerahan suatu kelayakan.

### **Dokumen**

Dokumen adalah keterangan (bukti) yang bertulis atau bercetak; surat yang dapat dijadikan keterangan atau bukti.

### **Reading lists**

Senarai bibliografi bahan bacaan dan rujukan utama untuk sesebuah program atau kursus yang ditawarkan di sesebuah universiti.

### **Manual**

Buku yang mengandungi panduan dan maklumat yang dirujuk untuk melaksanakan sesuatu.

### **Bahan bercetak**

Buku, monograf, prosiding, tesis, terbitan bersiri, peta, poster dan lain-lain bahan bercetak

### **Bahan bukan bercetak**

Mikrofilem, mikrofis, foto, kaset audio, kaset video, kit multimedia, filem, filem jalur, slaid dan bahan lain

### **Bahan Digital**

Cakera padat audio (CD), cakera padat video (VCD, DVD), CD-ROM/DVD-ROM, e-buku, e-jurnal

***E-books***

*E-books* atau buku elektronik adalah sejenis medium penyampaian maklumat yang merujuk kepada penggunaan data elektronik sebagai buku yang mengandungi pelbagai maklumat. E-buku ini terdapat dalam bentuk berbayar dan juga dalam bentuk percuma.

**Organisasi akademik**

Istilah umum yang digunakan untuk merujuk kepada semua entiti dalam universiti yang menjalankan fungsi teras akademik iaitu fakulti, sekolah, pusat, kolej dan institut.

## SINGKATAN

1	MQA	(The Malaysia Qualifications Agency)
2	EAC	(Engineering Accreditation Council Malaysia)
3	BEM	(Board of Engineers Malaysia)
4	IEM	(The Institutions of Engineers, Malaysia)
5	LAM	(Board of Architects Malaysia)
6	RIBA	(Royal Institute of British Architects)
7	RICS	(Royal Institution of Chartered Surveyors)
8	BQSM	(Board of Quantity Surveyors Malaysia)
9	BOVAEA	(The Board of Valuers Appraisers and Estate Agents Malaysia)
10	ROI	(Return of Investment)
11	URL	(Uniform Resource Locator)
12	CSR	(Corporate Social Responsibility)
13	ILL	(Interlibrary Loan)
14	IChemE	(Institution of Chemical Engineers)

## **1. LATAR BELAKANG**

Dalam Mesyuarat Majlis Ketua Pustakawan Bil. 2, 2016 telah diputuskan penubuhan Kumpulan Fokus Khas Kejuruteraan dan Seni Bina bagi Universiti Awam yang menawarkan program Kejuruteraan dan Seni Bina.

Tujuan penubuhan adalah untuk meningkatkan jaringan kolaborasi di antara Universiti Awam yang menawarkan program yang sama, mencapai kesepakatan dalam menangani masalah dan sebarang isu berbangkit, perkongsian pintar antara Universiti Awam dalam usaha menyahutsarakan Kementerian Pengajian Tinggi (KPT) dalam konsep kesepunyaan dan keserakanan.

## **2. PENGENALAN**

Sumber bahan rujukan yang relevan dan komprehensif adalah penting dalam menyokong aktiviti pengajaran/pembelajaran program sesebuah universiti. Justeru, penilaian dari badan-badan profesional diperlukan bagi menepati kualiti dan mematuhi standard Lembaga Akreditasi Profesional dalam dan luar negara. Akreditasi program penilaian perlu dilaksanakan bagi memastikan sama ada sesuatu program itu telah menepati keperluan kualiti minimum atau sebaliknya.

## **3. SKOP**

### **3.1 SKOP KEJURUTERAAN**

Skop kejuruteraan merujuk kepada organisasi akademik yang menawarkan dan melaksanakan program dalam bidang kejuruteraan meliputi pembelajaran, pengajaran, penyelidikan, pembangunan teknologi serta kerjasama industri yang berkaitan dengan disiplin kejuruteraan.

### **3.2 SKOP SENI BINA**

Skop Seni Bina merujuk kepada organisasi akademik yang menawarkan dan melaksanakan program dalam bidang seni bina meliputi pembelajaran, pengajaran, penyelidikan, pembangunan teknologi serta kerjasama industri yang berkaitan dengan disiplin seni bina.

#### **4. OBJEKTIF**

- 4.1. Memberi panduan kepada perpustakaan tentang penyediaan dokumen akreditasi yang berkualiti bagi memenuhi standard Panel Penilai Audit Akreditasi.
- 4.2. Memastikan sumber maklumat perpustakaan memenuhi keperluan program bagi menyokong pembelajaran, pengajaran dan penyelidikan fakulti.
- 4.3. Memastikan persekitaran fizikal yang kondusif dan menepati kriteria Panel Penilai Audit Akreditasi.
- 4.4. Memastikan staf kompeten untuk menghadapi proses audit akreditasi.
- 4.5. Mengadakan perkongsian ilmu dan kepakaran yang akan dikenal pasti.

#### **5. KRITERIA AKREDITASI**

##### 5.1 Penyediaan Maklumat Umum

##### 5.5.1 Penyediaan maklumat akreditasi/audit

- i. Pengenalan perpustakaan (carta organisasi, peta lokasi, staf, waktu operasi, keluasan perpustakaan)
- ii. Kelayakan staf
- iii. Jumlah sumber perpustakaan (bercetak/ tidak bercetak)
- iv. Fasiliti (WIFI, auditorium, makmal komputer, bilik perbincangan, ruang santai, kapasiti tempat duduk di semua ruang)
- v. Anggaran peruntukan tahunan (buku dan pangkalan data)
- vi. Perkhidmatan yang disediakan
- vii. Pencapaian perpustakaan (statistik pengunjung, peminjaman, penggunaan dan ROI pangkalan data, anugerah)
- viii. Capaian URL bagi koleksi elektronik (eg: ezproxy, OPAC, capaian sumber daripada universiti lain seperti MALRep/ MALCat/ MyTo/ KIK)

## 5.2. Penyediaan Dokumen

- 5.2.1 Senarai keseluruhan koleksi perpustakaan (buku/jurnal/majalah/standard) dalam bentuk bercetak atau dalam CD/DVD atau portal khas untuk tujuan akreditasi
  - i. Senarai rujukan 5 tahun kebelakang untuk setiap program
- 5.2.2 Penyediaan bahan pembelajaran dan pengajaran
  - i. Bahan bercetak
  - ii. Bahan bukan bercetak
  - iii. Bahan rujukan kursus/program
- 5.2.3 Bukti sokongan perkhidmatan yang disediakan
  - i. Pinjaman Antara Perpustakaan (*ILL - Interlibrary Loan*)
    - a) Statistik permohonan dalaman dan luaran
    - b) Statistik permohonan berjaya dan tidak berjaya
    - c) Kelayakan Pinjaman Antara Perpustakaan untuk pengguna (prasiswazah, pascasiswazah, pensyarah)
  - ii. Program Literasi Maklumat (Bilangan kelas dan peserta)
    - a) Prasiswazah
    - b) Pascasiswazah
    - c) Pensyarah/penyelidik
  - iii. Konsultasi
  - iv. Statistik pinjaman bahan (5 tahun kebelakang untuk setiap jabatan/ program) dan statistik pengunjung (fizikal/ maya)
  - v. Aktiviti pengguna di Perpustakaan
- 5.2.4 Bukti soal selidik kepuasan pengguna telah dijalankan
- 5.2.5 Senarai dan statistik penggunaan sumber elektronik langganan (buku elektronik/ jurnal elektronik/ pangkalan data atas talian) berserta ROI penggunaan pangkalan data dan buku.

### 5.3. Ketersediaan Ruang

#### 5.3.1 Ruang taklimat audit

- i. Memastikan ruang berada dalam keadaan kondusif dan bersedia menerima kehadiran auditor.

#### 5.3.2 Ruang lawatan audit

- i. Memastikan ruang lawatan seperti bilik 24 jam, bilik media, bilik diskusi, makmal komputer, ruang pengguna dan lain-lain dalam keadaan kondusif.

### 5.4. Persediaan Staf

5.4.1 Staf berkemahiran dalam pengaksesan bahan dan maklumat seperti standard, pangkalan data, statistik bahan dan pengguna.

5.4.2 Pustakawan perlu meningkatkan kemahiran komunikasi.

5.4.3 Staf perlu berketerampilan dan berkeyakinan semasa berhadapan dengan auditor.

5.4.4 Staf perlu melengkapkan diri dengan pengetahuan umum universiti dan perkembangan terkini dalam bidang yang diaudit.

- i. Staf tunggu sedia secara Sembang Langsung (*Live Chat*) di portal perpustakaan.

### 5.5. Keselamatan dan Kesihatan Pekerjaan

#### 5.5.1 Pengurusan keselamatan dan kesihatan di perpustakaan

- i. Alat pemadam api
- ii. Pelan laluan kecemasan
- iii. Sistem amaran kecemasan
- iv. Pintu kecemasan
- v. Hos bomba dan sistem *sprinkler*
- vi. Program kesedaran dan latihan secara berkala
- vii. dan lain-lain berkaitan

#### 5.5.2 Maklumat audit keselamatan bangunan

- i. Sijil layak menduduki sesebuah bangunan
- ii. Sijil penyelenggaraan lif
- iii. dan lain-lain berkaitan

#### 5.5.3 Pelaksanaan keselamatan dan kesihatan pekerjaan di perpustakaan

- i. Risiko ergonomik (kerusi tidak sesuai, kerja statik berpanjangan)
- ii. Risiko gelincir, tergelincir dan jatuh (lantai licin, tangga)
- iii. Risiko penggunaan elektrik (komputer, pencetak, wayar berselirat)
- iv. Perpindahan bahan berat (memindah buku/almari)
- v. Risiko kebakaran (pendawaian lama, peralatan elektrik)
- vi. Risiko kualiti udara dalam ruang tertutup






## 6. TARIKH KUAT KUASA

Garis panduan ini diguna pakai sebagai panduan persediaan audit akreditasi Universiti Awam dalam bidang Kejuruteraan dan Seni Bina.



**7. SENARAI BADAN AKREDITASI DAN BADAN PROFESIONAL KEJURUTERAAN DAN SENI BINA**

1	<b>Engineering Accreditation Council / Lembaga Akreditasi Kejuruteraan (EAC)</b>	<p>EAC (Engineering Accreditation Council / Lembaga Akreditasi Kejuruteraan)</p> 
2	<b>Malaysian Qualification Agency (MQA)</b>	
3	<b>InQKA</b>	
4	<b>Washington Accord</b>	
5	<b>Board of Engineers Malaysia / Lembaga Jurutera Malaysia (BEM)</b>	

6	The Institution of Engineers, Malaysia / Institusi Jurutera Malaysia (IEM)	
7	Energy Institute (EI)	
8	Institute of Electrical and Electronic Engineers (IEEE)	
9	Society of Engineering Education Malaysia (SEEM)	
10	Malaysian Tribology Society (MyTRIBOS)	
11	American Society of Mechanical Engineers (ASME)	
12	American Society for Quality (ASQ)	

13	Society of Environmental Engineers	
14	Chartered Professional Engineers Australia (CPEng)	
15	American Society of Civil Engineers (ASCE)	
16	Royal Society of Chemistry (RSC)	
17	American Chemical Society (ACS)	

18	International Association of Engineers (IAENG)	
19	South Asia Institute Of Science and Engineering (SAISE)	
20	IEEE Advancing Technology for Humanity	
21	IEEE Ras Asia	
22	American Society of Mechanical Engineering (ASME)	
23	Institution of Mechanical Engineer United Kingdom (IMECHE)	

24	Malaysia Board of Technologists (MBOT)	 <p>LEMBAGA TEKNOLOGIS MALAYSIA MALAYSIA BOARD OF TECHNOLOGISTS</p>
25	Asia Pacific Accreditation and Certification Commission (APACC)	 <p>Asia Pacific Accreditation and Certification Commission</p>

## 8. LAMPIRAN - Senarai *Library of Congress Outline* bagi bidang Kejuruteraan dan Senibina

### LIBRARY OF CONGRESS CLASSIFICATION OUTLINE

#### CLASS H - SOCIAL SCIENCES

##### Subclass H

H1-99 Social sciences (General)

##### Subclass HA

HA1-4737 Statistics  
HA29-32 Theory and method of social science statistics  
HA36-37 Statistical services. Statistical bureaus  
HA38-39 Registration of vital events. Vital records  
HA154-4737 Statistical data  
HA154-155 Universal statistics  
HA175-473 By region or country

##### Subclass HB

HB1-3840 Economic theory. Demography  
HB71-74 Economics as a science. Relation to other subjects  
HB75-130 History of economics. History of economic theory  
Including special economic schools  
HB131-147 Methodology  
HB135-147 Mathematical economics. Quantitative methods  
Including econometrics, input-output analysis, game theory  
HB201-206 Value. Utility  
HB221-236 Price  
HB238-251 Competition. Production. Wealth  
HB501 Capital. Capitalism  
HB522-715 Income. Factor shares  
HB535-551 Interest  
HB601 Profit  
HB615-715 Entrepreneurship. Risk and uncertainty.  
Property  
HB801-843 Consumption. Demand

HB846-846.8  
HB848-3697  
HB3711-3840

Welfare theory  
Demography. Population. Vital events  
Business cycles. Economic fluctuations

## LIBRARY OF CONGRESS CLASSIFICATION OUTLINE

### CLASS N - FINE ARTS

#### Subclass NA

NA1-9428	Architecture
NA1-60	General
NA100-130	Architecture and the state
NA190-1555.5	History
NA1995	Architecture as a profession
NA2000-2320	Study and teaching. Research
NA2335-2360	Competitions
NA2400-2460	Museums. Exhibitions
NA2500-2599	General works
NA 2599.5-2599.9	Architectural criticism
NA2695-2793	Architectural drawing and design
NA2835-4050	Details and decoration
NA4100-8480	Special classes of buildings
NA4100-4145	Classed by material
NA4150-4160	Classed by form
NA4170-8480	Classed by use
NA4170-(7020)	Public buildings
NA4590-5621	Religious architecture
NA7100-7884	Domestic architecture. Houses. Dwellings
NA7910-8125	Clubhouses, guild houses, etc.
NA8200-8260	Farm architecture
NA8300-8480	Outbuildings, gates, fences, etc.
NA9000-9428	Aesthetics of cities. City planning and beautifying

## LIBRARY OF CONGRESS CLASSIFICATION OUTLINE

### CLASS Q - SCIENCE

#### Subclass QA

QA1-939	Mathematics
QA1-43	General
QA47-59	Tables
QA71-90	Instruments and machines
QA75-76.95	Calculating machines
QA75.5-76.95	Electronic computers. Computer science
QA76.75-76.765	Computer software
QA101-(145)	Elementary mathematics. Arithmetic
QA150-272.5	Algebra
QA273-280	Probabilities. Mathematical statistics
QA299.6-433	Analysis
QA440-699	Geometry. Trigonometry. Topology
QA801-939	Analytic mechanics

#### Subclass QC

QC1-999	Physics
QC1-75	General
QC81-114	Weights and measures
QC120-168.85	Descriptive and experimental mechanics
QC170-197	Atomic physics. Constitution and properties of matter
	Including molecular physics, relativity, quantum
theory, and	
	solid state physics
QC221-246	Acoustics. Sound
QC251-338.5	Heat
QC310.15-319	Thermodynamics
QC350-467	Optics. Light
QC450-467	Spectroscopy
QC474-496.9	Radiation physics (General)
QC501-766	Electricity and magnetism
QC501-(721)	Electricity
QC669-675.8	Electromagnetic theory
QC676-678.6	Radio waves (Theory)
QC701-715.4	Electric discharge
QC717.6-718.8	Plasma physics. Ionized gases
QC750-766	Magnetism
QC770-798	Nuclear and particle physics. Atomic energy. Radioactivity
QC793-793.5	Elementary particle physics
QC794.95-798	Radioactivity and radioactive substances
QC801-809	Geophysics. Cosmic physics
QC811-849	Geomagnetism

QC851-999	Meteorology. Climatology Including the earth's atmosphere
QC974.5-976	Meteorological optics
QC980-999	Climatology and weather
QC994.95-999	Weather forecasting

**Subclass QD**

QD1-999	Chemistry
QD1-65	General Including alchemy
QD71-142	Analytical chemistry
QD146-197	Inorganic chemistry
QD241-441	Organic chemistry
QD415-436	Biochemistry
QD450-801	Physical and theoretical chemistry
QD625-655	Radiation chemistry
QD701-731	Photochemistry
QD901-999	Crystallography

**Subclass QH**

QH301-705.5	Biology (General)
QH359-425	Evolution
QH426-470	Genetics
QH471-489	Reproduction
QH501-531	Life
QH540-549.5	Ecology
QH573-671	Cytology
QH705-705.5	Economic biology

## LIBRARY OF CONGRESS CLASSIFICATION OUTLINE

### CLASS R - MEDICINE

#### Subclass R

R855-855.5 Medical technology

#### Subclass RC

RC1200-1245 Sports medicine

#### Subclass RD

RD792-811 Physical rehabilitation

#### Subclass RM

RM695-893 Physical medicine. Physical therapy  
Including massage, exercise, occupational therapy,  
hydrotherapy, phototherapy, radiotherapy,  
thermotherapy, electrotherapy

RM930-931 Rehabilitation therapy  
RM950 Rehabilitation technology

## LIBRARY OF CONGRESS CLASSIFICATION OUTLINE

### CLASS T – TECHNOLOGY

#### Subclass T

T1-995	Technology (General)
T10.5-11.9	Communication of technical information
T11.95-12.5	Industrial directories
T55-55.3	Industrial safety. Industrial accident prevention
T55.4-60.8	Industrial engineering. Management engineering
T57-57.97	Applied mathematics. Quantitative methods
T57.6-57.97	Operations research. Systems analysis
T58.4	Managerial control systems
T58.5-58.64	Information technology
T58.6-58.62	Management information systems
T58.7-58.8	Production capacity. Manufacturing capacity
T59-59.2	Standardization
T59.5	Automation
T59.7-59.77	Human engineering in industry. Man-machine systems
T60-60.8	Work measurement. Methods engineering
T61-173	Technical education. Technical schools
T173.2-174.5	Technological change
T175-178	Industrial research. Research and development
T201-342	Patents. Trademarks
T351-385	Mechanical drawing. Engineering graphics
T391-995	Exhibitions. Trade shows. World's fairs

#### Subclass TA

TA1-2040	Engineering (General). Civil engineering (General)
TA164	Bioengineering
TA165	Engineering instruments, meters, etc. Industrial instrumentation
TA166-167	Human engineering
TA168	Systems engineering
TA170-171	Environmental engineering
TA174	Engineering design
TA177.4-185	Engineering economy
TA190-194	Management of engineering works
TA197-198	Engineering meteorology
TA213-215	Engineering machinery, tools, and implements
TA329-348	Engineering mathematics. Engineering analysis
TA349-359	Mechanics of engineering. Applied mechanics
TA365-367	Acoustics in engineering. Acoustical engineering
TA401-492	Materials of engineering and construction. Mechanics of materials

TA495	Disasters and engineering
TA501-625	Surveying
TA630-695	Structural engineering (General)
TA703-712	Engineering geology. Rock mechanics. Soil mechanics. Underground construction
TA715-787	Earthwork. Foundations
TA800-820	Tunneling. Tunnels
TA1001-1280	Transportation engineering
TA1501-1820	Applied optics. Photonics
TA2001-2040	Plasma engineering. Applied plasma dynamics

### **Subclass TC**

TC1-978	Hydraulic engineering
TC160-181	Technical hydraulics
TC183-201	General preliminary operations. Dredging. Submarine building
TC203-380	Harbors and coast protective works. Coastal engineering. Lighthouses
TC401-506	River, lake, and water-supply engineering (General)
TC530-537	River protective works. Regulation. Flood control
TC540-558	Dams. Barrages
TC601-791	Canals and inland navigation. Waterways
TC801-978	Irrigation engineering. Reclamation of wasteland. Drainage
TC1501-1800	Ocean engineering

### **Subclass TD**

TD1-1066	Environmental technology. Sanitary engineering
TD159-168	Municipal engineering
TD169-171.8	Environmental protection
TD172-193.5	Environmental pollution
TD194-195	Environmental effects of industries and plants
TD201-500	Water supply for domestic and industrial purposes
TD419-428	Water pollution
TD429.5-480.7	Water purification. Water treatment and conditioning.
Saline	water conversion
TD481-493	Water distribution systems
TD511-780	Sewage collection and disposal systems. Sewerage
TD783-812.5	Municipal refuse. Solid wastes
TD813-870	Street cleaning. Litter and its removal
TD878-894	Special types of environment Including soil pollution, air pollution, noise pollution
TD895-899	Industrial and factory sanitation
TD896-899	Industrial and factory wastes
TD920-934	Rural and farm sanitary engineering
TD940-949	Low temperature sanitary engineering
TD1020-1066	Hazardous substances and their disposal

### **Subclass TE**

TE1-450	Highway engineering. Roads and pavements
TE175-176.5	Highway design. Interchanges and intersections
TE177-178.8	Roadside development. Landscaping
TE200-205	Materials for roadmaking
TE206-209.5	Location engineering
TE210-228.3	Construction details Including foundations, maintenance, equipment
TE250-278.8	Pavements and paved roads
TE279	Streets
TE279.5-298	Pedestrian facilities
TE280-295	Sidewalks. Footpaths. Flagging
TE298	Curbs. Curbstones

### **Subclass TF**

TF1-1620	Railroad engineering and operation
TF200-320	Railway construction
TF340-499	Railway equipment and supplies
TF501-668	Railway operation and management
TF670-851	Local and light railways
TF840-851	Elevated railways and subways
TF855-1127	Electric railways
TF1300-1620	High speed ground transportation

### **Subclass TG**

TG1-470	Bridge engineering
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### **Subclass TH**

TH1-9745	Building construction
TH845-895	Architectural engineering. Structural engineering of buildings
TH900-915	Construction equipment in building
TH1000-1725	Systems of building construction Including fireproof construction, concrete construction
TH2025-3000	Details in building design and construction Including walls, roofs
TH3301-3411	Maintenance and repair
TH4021-4977	Buildings: Construction with reference to use Including public buildings, dwellings
TH5011-5701	Construction by phase of the work (Building trades)
TH6014-6081	Environmental engineering of buildings. Sanitary
engineering of	buildings
TH6101-6887	Plumbing and pipefitting
TH7005-7699	Heating and ventilation. Air conditioning
TH7700-7975	Illumination. Lighting
TH8001-8581	Decoration and decorative furnishings
TH9025-9745	Protection of buildings Including protection from dampness, fire, burglary

## Subclass TJ

TJ1-1570	Mechanical engineering and machinery
TJ163.13-163.25	Power resources
TJ163.26-163.5	Energy conservation
TJ170-179	Mechanics applied to machinery. Dynamics
TJ181-210	Mechanical movements
TJ210.2-211.47	Mechanical devices and figures. Automata. Ingenious mechanisms.
	Robots (General)
TJ212-225	Control engineering systems. Automatic machinery
(General)	
TJ227-240	Machine design and drawing
TJ241-254.7	Machine construction (General)
TJ255-265	Heat engines
TJ266-267.5	Turbines. Turbomachines (General)
TJ268-740	Steam engineering
TJ603-695	Locomotives
TJ751-805	Miscellaneous motors and engines Including gas, gasoline, diesel engines
TJ807-830	Renewable energy sources
TJ836-927	Hydraulic machinery
TJ940-940.5	Vacuum technology
TJ950-1030	Pneumatic machinery
TJ1040-1119	Machinery exclusive of prime movers
TJ1125-1345	Machine shops and machine shop practice
TJ1350-1418	Hoisting and conveying machinery
TJ1425-1475	Lifting and pressing machinery
TJ1480-1496	Agricultural machinery. Farm machinery
TJ1501-1519	Sewing machines

## Subclass TK

TK1-9971	Electrical engineering. Electronics. Nuclear engineering
TK301-399	Electric meters
TK452-454.4	Electric apparatus and materials. Electric circuits. Electric networks
TK1001-1841	Production of electric energy or power. Powerplants.
Central	stations
TK2000-2891	Dynamolectric machinery and auxiliaries Including generators, motors, transformers
TK2896-2985	Production of electricity by direct energy conversion
TK3001-3521	Distribution or transmission of electric power
TK4001-4102	Applications of electric power
TK4125-4399	Electric lighting
TK4601-4661	Electric heating
TK5101-6720	Telecommunication Including telegraphy, telephone, radio, radar,
television	
TK7800-8360	Electronics

TK7885-7895	Computer engineering. Computer hardware
TK8300-8360	Photoelectronic devices (General)
TK9001-9401	Nuclear engineering. Atomic power
TK9900-9971	Electricity for amateurs. Amateur constructors' manuals

**Subclass TL**

TL1-4050	Motor vehicles. Aeronautics. Astronautics
TL1-484	Motor vehicles. Cycles
TL500-777	Aeronautics. Aeronautical engineering
TL780-785.8	Rocket propulsion. Rockets
TL787-4050	Astronautics. Space travel

**Subclass TN**

TN1-997	Mining engineering. Metallurgy
TN263-271	Mineral deposits. Metallic ore deposits. Prospecting
TN275-325	Practical mining operations. Safety measures
TN331-347	Mine transportation, haulage and hoisting. Mining machinery
TN400-580	Ore deposits and mining of particular metals
TN600-799	Metallurgy
TN799.5-948	Nonmetallic minerals
TN950-997	Building and ornamental stones

**Subclass TP**

TP1-1185	Chemical technology
TP155-156	Chemical engineering
TP200-248	Chemicals: Manufacture, use, etc.
TP248.13-248.65	Biotechnology
TP250-261	Industrial electrochemistry
TP267.5-301	Explosives and pyrotechnics
TP315-360	Fuel
TP368-456	Food processing and manufacture
TP480-498	Low temperature engineering. Cryogenic engineering.
Refrigeration	
TP500-660	Fermentation industries. Beverages. Alcohol
TP670-699	Oils, fats, and waxes
TP690-692.5	Petroleum refining. Petroleum products
TP700-746	Illuminating industries (Nonelectric)
TP751-762	Gas industry
TP785-869	Clay industries. Ceramics. Glass
TP875-888	Cement industries
TP890-933	Textile bleaching, dyeing, printing, etc.
TP934-945	Paints, pigments, varnishes, etc.
TP1080-1185	Polymers and polymer manufacture

**Subclass TS**

TS1-2301	Manufactures
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TS155-194	Production management. Operations management
TS195-198.8	Packaging
TS200-770	Metal manufactures. Metalworking
TS780-788	Stonework
TS800-937	Wood technology. Lumber
TS840-915	Wood products. Furniture
TS920-937	Chemical processing of wood
TS940-1047	Leather industries. Tanning
TS1060-1070	Furs
TS1080-1268	Paper manufacture and trade
TS1300-1865	Textile industries
TS1870-1935	Rubber industry
TS1950-1982	Animal products
TS2120-2159	Cereals and grain. Milling industry
TS2220-2283	Tobacco industry
TS2284-2288	Animal feeds and feed mills. Pet food industry

## LIBRARY OF CONGRESS CLASSIFICATION OUTLINE

### CLASS V - NAVAL SCIENCE

#### Subclass VM

VM1-989	Naval architecture. Shipbuilding. Marine engineering
VM15-124	History
VM165-276	Study and teaching
VM295-296	Contracts and specifications
VM298.5-301	Shipbuilding industry. Shipyards
VM311-466	Special types of vessels
VM595-989	Marine engineering
VM975-989	Diving

## 9. RUJUKAN

- 9.1 Engineering programmes accreditation manual (2017), Board of Engineers Malaysia
- 9.2 Standard Perpustakaan Universiti Malaysia (2016), PERPUN
- 9.3 Kod Amalan Akreditasi Program (2010), MQA
- 9.4 RIBA procedures for validation and validation criteria for UK and international courses and examinations in architecture, 2<sup>nd</sup> rev. (2014)
- 9.5 The Library of Congress Classification (LCCs)
- 9.6 BS 11620:2023 – Information and documentation. Library performance indicators