



Student Handbook

Diploma in Manufacturing Technology

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Compiled by
Faculty of Engineering and Technology,
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Part A. General Information

1. Background and Overview of Faculty of Engineering and Technology

Formerly known as Faculty of Engineering and Built Environment (FEBE) began as the School of Technology (SOT) which was set up in 1972. It was split into two faculties, namely Faculty of Engineering and Technology (FOET) and Faculty of Built Environment (FOBE) in May 2017. The programmes conducted in FOET are designed in such a way that would prepare students to register their Professional Membership with professional bodies locally and internationally in particular Board of Engineers Malaysia (BEM), Institution of Engineers, Malaysia (IEM), Engineering Councils (EC), Malaysia Board of Technologists (MBOT) etc. for engineering and technology programmes. The aim of FOET has always been to BUILD YOUR DREAMS AND ENGINEERING YOUR FUTURE, ensuring your dreams fulfilled and your future secured. Currently, there are 3 departments in FOET, namely

- Department of Electrical and Electronics Engineering
- Department of Mechanical Engineering
- Department of Manufacturing Technology

In Faculty of Engineering and Technology, we provide

- State-of-the-art Laboratories equipped with industry standard equipment
- Holistic education with the focus on strong technical skill and development to be a professional
- A comprehensive coverage of programmes in both the Engineering and Built Environment field
- Qualified and Dedicated staff who are committed to BUILDING YOUR DREAMS AND ENGINEERING YOUR FUTURE
- Projects and assignments that focuses on real industrial problems with industrial training that provides a taste of working on actual industrial problems and solution
- Extensive links with industry as well as having graduates who are captains of their industries
- Programmes which are well accepted by institution around the world resulting in a wide range of progression routes for further studies at both undergraduate and post graduate level.

2. Programmes Offered in the Faculty/Department

The current focus areas are as follows:

Electrical and Electronics Engineering, Electronics Engineering Technology, Mechanical Engineering, Mechatronics Engineering, Product Development Technology and Manufacturing Technology.

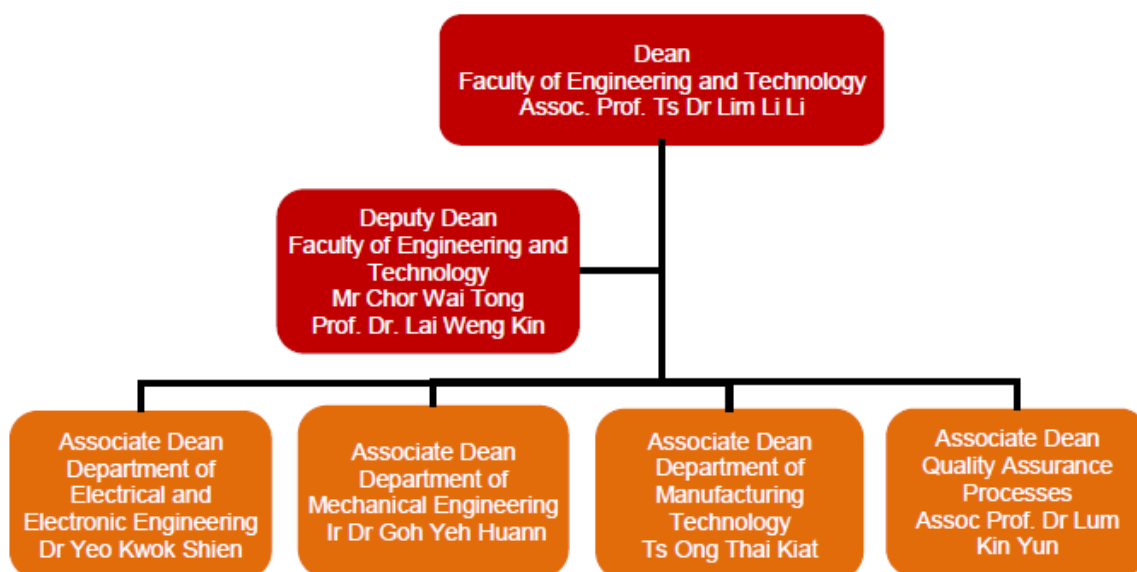
In the Department of Manufacturing Technology, we offer the following programmes:

Diploma in Manufacturing Technology
Diploma in Product Development Technology
Master of Engineering Science
Doctor of Philosophy in Engineering

NB: A full list of programmes offered at FOET can be referred to at:

URL: <http://www.tarc.edu.my/foet/index.jsp>

3. Organisation Chart



4. Staff Listing

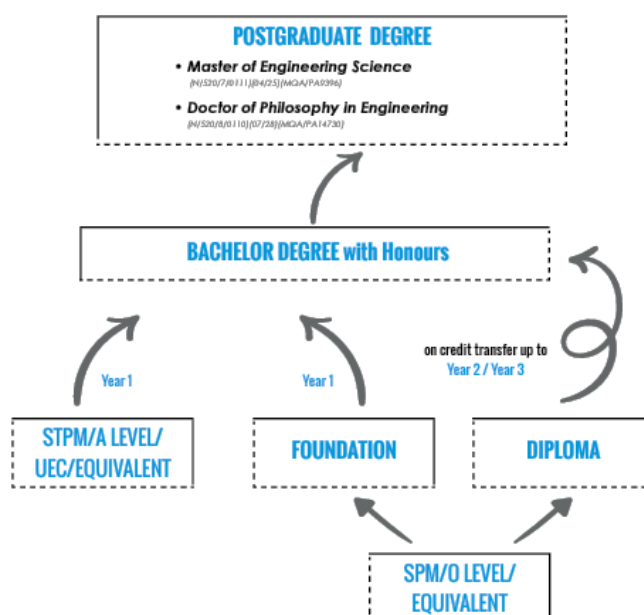
Students can view the information of the staff listing and the academic team from the Faculty website. The teaching team and the office venue are stated in the students' time table for student information.

NB: A full list of staff list for the Department of Manufacturing Technology at FOET can be referred to at:

URL: <http://www.tarc.edu.my/staffDirectory.jsp>

5. Progression Route

GENERAL PROGRESSION ROUTE



* The Faculty of Engineering and Technology offers the following postgraduate programme:

• Master of Engineering Science KPT/JPS/N/520/7/0111/04/25

6. Minimum Entry Requirements

	SPM	O Level	UEC	Certificate
Diploma in Product Development Technology	3 Credits in the relevant subjects	3 Grade C in the relevant subjects	3 Grade B in the relevant subjects	■ Relevant Certificate accredited by MQA
Diploma in Manufacturing Technology	<p>Compulsory subjects:</p> <p>(i) SPM Credit/O Level Grade C in Mathematics/UEC Grade B in one mathematics subject</p> <p>(ii) SPM Credit/O Level Grade C/ UEC Grade B in one relevant science/technical/vocational subject</p> <p>(iii) SPM Pass/O Level Grade E (Pass)/ UEC Grade C in English Language</p>			<p>OR</p> <p>■ Relevant Skilled/ Technical/ Vocational Certificate accredited by MQA or recognised by the Malaysian Government</p>

Note:

- a) SPM holders must have at least a pass in Bahasa Melayu and SPM holders from Year 2013 onwards must have at least a pass in Sejarah.
- b) Students without a credit in SPM Bahasa Melayu are required to pass Bahasa Kebangsaan A before the award of Diploma.
- c) Equivalent qualifications/qualifications from other Institution of Higher Learning (IHL) will be considered on a case-by-case basis.
- d) Subject to the Ministry of Higher Education latest requirements.

7. Intra and Inter Faculty Transfer

A new student may apply for programme transfer at the beginning of the programme within the stipulated deadline. Applications for intra-faculty transfers (i.e. programme transfer within the faculty should be submitted to the FOET Office (Block M) whereas applications for inter-faculty transfers (i.e. programme transfers to other faculties) should be submitted to the Department of Admissions & Credit Evaluation (Ground Floor, Bangunan Tun Tan Siew Sin) within a stipulated deadline. The closing date for programme/campus transfer is normally on the second Friday after commencement of lectures. Approval for the programme / campus transfer is not guaranteed. Students whose transfers are successful are required to collect their transfer offer letter from FOET Office (for Intra-Faculty Transfer or Department of Admissions & Credit Evaluation (for Inter-Faculty Transfer / Campus Transfer). Students who have accepted the programme / campus transfer will **NOT** be allowed to transfer back into their original programme / campus of study after accepting the transfer through the payment of fees.

8. Lecture and Tutorial Plan

Your respective course lecturers will provide you with a copy of the course plan for lectures and tutorials in week 1 of each semester.

9. Academic Calendar

Academic calendar in each academic year of the intakes for bachelor degree, diploma etc are available at URL: <http://www.tarc.edu.my/admissions/academic-calendar.html> which includes dates for new students reporting, study weeks, examinations weeks and holidays for all semesters of the Academic Year.

10. General Information

10.1 Important Information on Notice Board and Intranet

Students must read the important announcements and information on the notice board placed outside the FOET, Student Intranet, and TAR UMT website. Such announcements and information may include notices on time-table, deadline for online repeat registration, printing of bills & payment, loan application, deadline of printing and payment of tuition fees, interview session for unsatisfactory attendance, etc. The onus is on the students to read these important announcements and information regularly.

10.2 E-Learning System & University E-Mail

Important announcements and information will be channeled to you through the University Student Intranet and University email. You are advised to log-in to your intranet and University email daily to not miss out on any important announcements, information and deadlines. For your University email, a letter will be given to you stating your login ID and password. You are advised to retain this letter for your future reference.

10.3 Change of Address or Contact Number

It is the responsibility of the students to notify the office of the Faculty of any changes in their personal particulars, such as addresses or contact numbers so as to ensure their particulars in the Faculty database are accurate and up-to-date at all times. The Faculty will not be responsible or accountable for delayed, lost mail, or wrong information printed on official documents due to incorrect / obsolete students' addresses and contacts in the Faculty database. Application form for change of addresses or contact number can be obtained from the Faculty office. The completed form, duly filled in and signed, shall be submitted to the office of the Faculty whenever the changes occur.

10.4 Student Time Table

The student time table will be displayed on the notice board outside the office of the Faculty and the Student Intranet, before the commencement of each semester. Students may download their time table from the Student Intranet at TAR UMT website. In order to help students get the most out of their education, subject to availability of resources, classes shall be arranged from 8am to 9pm from Monday to Saturday, except for Public Holidays. Attendance in all classes is mandatory. Exceptions may be made for extenuating circumstances, with applications submitted and prior approval obtained from the faculty.

10.5 Tutorial Groups

Each student will be assigned to a tutorial group. Exchange of tutorial groups will not be permitted except under exceptional circumstances for which prior approval in writing must be obtained from the Associate Dean of the Department. Closing date for submission of Application for Changing of Tutorial Group is normally at the end of second week after the commencement of each semester. Late application will not be entertained.

10.6 Consultation Hours

Each lecturer's consultation hours will be displayed outside their office and FOET noticeboard. Students may see the lecturers during the consultation hours if they have problems in their studies. In order to facilitate effective learning, students are advised to take the active learning approach and read up on the topic(s) concerned and have peer discussions prior to consulting the lecturer.

10.7 Attendance (Lectures, Tutorials and Practical)

Students MUST register their attendance via TARApp using TAR UMT WiFi. Students are reminded that attendance is compulsory for all the scheduled classes. Please DO NOT take attendance on behalf of other students nor share the mobile pin code with other students if they are not present for the classes. This action will be deemed as academic misconduct. All students are expected to behave in a manner to uphold the principles of academic integrity. Any students found liable of academic misconduct shall be subjected to disciplinary actions.

Refer to the Academic Regulations for Bachelor & Diploma Programmes 2023 in Student Intranet for more information.

10.8 Application for Leave of Absence

Application for leave of absence may be performed through the Student intranet. Application for leave of absence due to medical or compassionate reasons, must be duly filled in, attached together with relevant supporting documents and submitted through the Student intranet within three (3) days from the date he/she resume his/her study. For other reasons, application for leave of absence, must be duly filled and submitted, with a written explanation and/or supporting documents at least one (1) week before the date of absence.

10.9 Reinstatement, Deferment, Withdrawal of Studies

Reinstatement of Study

You may apply for reinstatement of studies if your name has been removed from the University register for the following reasons:

(a) Arrears of tuition fees; or

(b) Arrears of University development fees and insurance (payable by repeat students during the commencement of every academic year)

The application form can be downloaded obtained from the TAR UMT website: > Apply and Study > Registered Student > General Information > Reinstatement of Study, or from the Student Intranet under Information Gateway: - Department of Admission & Credit Evaluation (DACE), or obtainable from the respective Faculty/ DACE. You are required to attach a letter of explanation signed by you together with the completed application form and supporting documents. For students who wish to withdraw in the

current semester, the application form and letter of explanation must be submitted to the FOET office latest by the end of the 8th week (in a long semester) or the end of the 4th week (in a short semester).

For students who have withdrawn in the previous semester, the application form and letter of explanation must be submitted to the Admissions office not less than 1 month before the semester starts.

Your application is subject to the approval of the University. You are required to see your Programme Leader prior to submission of application for reinstatement.

Deferment of Studies

If you wish to defer your studies due to extenuating circumstances, you may apply for deferment of study. The application form can be downloaded from the TAR UMT website: > Apply and Study > Registered Student > General Information > Deferment of Study, or from the Student Intranet under Information Gateway: – Department of Admissions & Credit Evaluation (DACE), or obtainable from the respective Faculty/DACE. The form together with letter of explanation and supporting documents must be submitted to the Admissions office by the 6th week (in a long semester) or 3rd week (in a short semester).

You can only defer for one academic year during the duration of study. Extension for deferment may be considered for one additional year only under exceptional extenuating circumstances. You are required to re-submit your application form together with relevant supporting documents for extension.

The application is subject to the approval of the University. You are required to see your Programme Leader prior to submitting your application for deferment.

Withdrawal of Study

Students who wish to withdraw from their programmes may notify the Department of Admissions & Credit Evaluation (DACE) in writing OR complete a prescribed 'Notification of Withdrawal' form obtainable from the Department of Admissions & Credit Evaluation. The Withdrawal Form can also be downloaded from the TAR UMT website: > Apply and Study > Registered Student > General Information > Withdrawal from Programme or from the Student Intranet under Information Gateway: – Department of Admissions & Credit Evaluation (DACE). The duly completed form is to be submitted to the Department together with the Student ID card.

Students who did not attend classes or discontinued class attendance in a new semester without notifying the University of their withdrawal shall be liable to all fees due to the University for that semester and subsequently shall be withdrawn from the university due to the arrears of fees.

The date of receipt of a student's withdrawal notification will be the official date of withdrawal even if the student has stopped attending classes earlier.

Ex-TARCians who had withdrawn from their Bachelor Degree/Diploma programme and have enrolled into another programme of the same level may be eligible for horizontal credit transfer. The application for horizontal credit transfer is to be made at the respective Faculty latest by Friday of week 4 (for long semester) or week 3 (for short semester) after the commencement of the semester first joined.

The application and more information is available at <https://www.tarc.edu.my/files/admissions/form/AE48885A-7057-47AA-9A92-88142B8C6E44.pdf>

NB: Students are required to constantly refer to Intranet under Department of Admission and Credit Evaluation (DACE) for updated notices and information.

10.10 Student Dialogue

The Faculty will conduct the Student Dialogue sessions with student representatives on programme matters twice in a 14 lecture-week semester of each academic year and once in a 7 lecture-week semester.

10.11 Online Course Evaluation Survey

Towards the end of each semester, all students are required to complete the online course evaluation survey for all courses conducted. Online course evaluation survey is open in weeks 10 to 11 of the 14 lecture-week semesters and weeks 4 to 5 of the 7 lecture-week semesters.

10.12 Online Tracer Study

It is compulsory for all graduates to fill up the online tracer study as required by the Ministry of Education. For more information, please refer to Student Intranet at TAR UMT website.

10.13 Rules and Conduct in Laboratories

Rules and conduct includes operational rules and safety rules in laboratories are clearly displayed in each and every laboratory, users are strictly required to observe and adhere to the rules and regulations to ensure the smooth operation of the laboratories and safe condition are constantly maintained in the laboratories.

10.14 Office Matter

Students are required to refer to student intranet, notice board and office for any office matters and information from time to time so that you are updated with the latest information.

10.15 Students Attire

Students shall dress appropriately and conform to the following guidelines:

Within campus except games and co-curricular activities:

- i. Collared shirts/T-shirt with sleeves and pants/jeans/skirt. No tattered attire is allowed, especially jeans.
- ii. Shirts (except Hawaiian-style shirt) should be tucked in.
- iii. Shorts are not allowed.
- iv. Female students should dress appropriately and modestly. Miniskirts / dresses, high slits or low necklines, "bare back" apparel and exposed midriff and spaghetti-straps or see-through blouses are not allowed.
- v. Proper footwear, shoes/sandals shall be worn. Japanese slippers are not allowed.

Laboratory Attire

- i. Clothing that covers the upper body, arms, and entire leg to the ankle (e.g., pants, skirt, coveralls, lab coat) which fully protects exposed skin.
- ii. Closed-toe shoes that resists rapid penetration by spilled liquids or sharps.
- iii. In laboratories where a fire danger is present, avoid clothing made of synthetic fibres. Wear less flammable natural fibres, such as wool, cotton, jute, flax, and silk.
- iv. Students must be equipped with appropriate personal protective equipment (PPE) relevant to each laboratory. It is the responsibility of the students to observe and abide by the rules and regulations related to laboratory operations.

For games and co-curricular activities:

- i. Proper sports attire (T-shirt, short/track bottom and sports shoes) should be worn at all times.

11. Evaluation and Assessment

11.1 Assessment Components

Students shall be evaluated through the following components:

- a) Final examination; and/or
- b) Coursework which includes test, quiz, practical, project, report & case study; and/or
- c) Any other evaluation approved by TAR UMT.

11.2 Coursework Assessment

11.2.1 Coursework

Coursework comprises of a combination of group and/or individual assignments, oral presentations, short tests, quizzes, laboratory experiment or practical reports, etc.

11.2.2 Coursework Threshold

The pass marks for coursework is 50%. All students must pass the coursework, failing which the students are required to repeat the course concerned. Late submission for coursework will be penalty according to the guidelines for submission of coursework.

11.2.3 Coursework Plagiarism

The Faculty views the plagiarism or collusion cases very seriously. These include, but not limited to, plagiarism or collusion in any part of their assignments, projects or written work, threaten the values of academic work and undermine the credibility and integrity of TAR UMT's awards. Plagiarism or collusion will be dealt with appropriately by the Faculty. Such offenders shall appear before a panel of enquiry at the Faculty and appropriate punishment will be meted out.

Punishment may include failing the students' assignment or project, re-submission of another piece of work or downgrading of the work to the maximum of a pass grade.

11.2.4 What Constitutes "Plagiarism" and "Collusion"?

Plagiarism according to the Oxford Advanced Learner's Dictionary of Current English means "take and use somebody else's ideas, words, etc as if they were one's own". Plagiarism can take the form of reproduction without acknowledgement from published or unpublished works of others including materials downloaded from computer files and the Internet. Collusion can be deemed to be a form of plagiarism involving the unauthorised co-operation between two or more people with deceptive intention.

11.2.5 Student Obligation

Students are deemed to have signed a declaration that the work submitted, such as course work assignment, essays and projects, etc. is their own work and that they have not in any way knowingly allow another student to copy it. It will be assumed that all submitted work is that of the students' own work.

11.2.6 Referencing System

Students are expected to familiarise themselves with or make use of method(s) of citing other people's work in accordance with acceptable referencing. The referencing system used in FOET is the IEEE Referencing System.

12. Examinations

12.1 Grading System and Examination Rules

1. For Diploma, the University grading scheme is as follows:

[Applicable to July 2023 Year 1 Semester 1 New Intake in Academic Year 2023/2024]

GRADE	MARKS RANGE	GRADE POINT	DESCRIPTION
A+	90 - 100	4.0000	High Distinction
A	80 - 89	4.0000	Distinction
A-	75 - 79	3.6700	Distinction
B+	70 - 74	3.3300	Merit
B	65 - 69	3.0000	Merit
B-	60 - 64	2.6700	Merit
C+	55 - 59	2.3300	Pass
C	50 - 54	2.0000	Pass
F	0 - 49	0.0000	Fail

Passing grade is C and above

2. The Grade Point Average (GPA) for an examination sitting shall be determined by dividing the total Quality Points by the total Credits of all the courses (excluding courses which have no contribution to the GPA) attempted in the same sitting. The Quality Point of a course shall be defined as the Grade Point score multiplied by the Credits of the course.

$$\text{Quality Point} = \text{Grade Point} \times \text{Credits of the course}$$

$$GPA = \frac{\text{Total Quality Points for course(s) with CGPA bearing registered in a Semester}}{\text{Total Credits for all course(s) with CGPA bearing in a Semester}}$$

3. The Cumulative Grade Point Average (CGPA) shall be determined by dividing the Cumulative Quality Points earned by the Cumulative Credits attempted (excluding Credits of course(s) which have no contribution to the GPA/CGPA). Credits of a course which has been attempted more than once shall be counted only once for the Cumulative Credits attempted in determining the CGPA.

$$CGPA = \frac{\text{Total Quality Points for course(s) with CGPA bearing for all Semesters}}{\text{Total Credits for all course(s) with CGPA bearing in all Semesters}}$$

4. Grades A, A-, B+, B, B-, C+, C & F shall be included in the calculation of the GPA and CGPA. Courses not included in the calculation of the GPA and CGPA include:
- (a) courses which have been given exemptions
 - (b) courses which have been awarded Satisfactory (S), Unsatisfactory (U) or Absent with valid reason (I)
 - (c) MPU-3213 Bahasa Kebangsaan A

5. Normally, Candidates shall be evaluated through the following components:

- (a) Final examination; and/or
- (b) Coursework which includes test, quiz, project, report & case study; and/or
- (c) Practical; and/or
- (d) Any other evaluation approved by the Senate.

6. There shall be threshold requirements for all coursework and final examination as the Senate shall decide:

- (a) Academic courses shall be 50/100 marks for final coursework/practical and 40/100 marks for final examination.
- (b) Mata pelajaran Pengajian Umum (MPU) courses with exception of Co-curriculum shall be 50/100 marks for coursework and 20/100 marks for final examination.

7. The maximum number of attempts allowed for a candidate for a course is four (4) attempts. Thereafter, the candidate shall be required to leave the programme of study.

8. (a) A candidate who fails a course shall repeat the course as decided by the Senate and the latest grade obtained from the repeat course shall be taken for computation of the GPA and CGPA. Under special circumstances as decided by the Senate, a candidate in a graduating semester may be allowed to re-sit the failed course(s).

Notwithstanding the above,

- (b) i. a candidate who fails a course in the first attempt, may be permitted to opt for a resit, on the first instance, when the course is next made available. In the event the said candidate then fails upon the resit, the candidate shall thereafter repeat the course. In the event the candidate passes the course upon a resit as envisaged above, the candidate's grade shall be capped at a minimum pass grade (C).
- ii. with effect from May 2016/2017 academic year, a candidate who has failed the course(s) in the first attempt, may opt to resit the failed course(s), if the following criteria is fulfilled:
 - (1) a minimum CGPA of 1.5000; AND
 - (2) obtained a minimum of 30 final mark for the failed course(s) concerned; AND
 - (3) fulfilled threshold requirements for coursework/practical of the failed course(s) concerned.Notwithstanding the above, the Board of Examiners may, at its discretion consider any exceptional circumstances (e.g. course(s) with exceptionally high failure rate), to permit a resit opportunity to candidates.

12.2 Candidate Academic Status

A candidate's academic standing shall be determined at the end of each semester based on his/her GPA and or CGPA value. The Senate upon the recommendation of the Board of Examiners shall decide the status of the candidate. The guidelines on the academic load shall apply to candidates with the following status:

(a) Good Status Unless a student of the Tunku Abdul Rahman University of Management and Technology being a candidate is placed on Probation or Warning or Final Warning status, he/she shall be deemed to be placed on Good status. A candidate on Good status shall register for ALL courses offered in the semester of his/her programme.

(b) Probation Status If a candidate's GPA is less than 2.0000 at the end of a semester, except in a semester where all courses taken do not contribute towards the computation of GPA and CGPA, he/she shall be placed on "probation" status in his/her programme. The academic probation period shall end when the candidate has attained a GPA of 2.0000 and above in the following semester.

(c) Warning Status A candidate on Probation status who fails to obtain a minimum GPA of 2.0000 at the end of the semester, except in a semester where all courses taken do not contribute towards the computation of GPA and CGPA, shall be placed on "Warning" status in his/her programme. The academic warning period shall end when the candidate has attained a GPA of 2.0000 and above at the end of the following semester. By the end of the said academic warning semester, if the candidate's GPA is less than 2.0000 AND CGPA is less than 1.0000, then the candidate shall leave the programme. A candidate on Warning status shall not be allowed to register for industrial training course.

(d) Final Warning Status A candidate on Warning status who, by the end of such warning status semester obtains a GPA of less than 2.0000 AND CGPA of 1.0000 and above shall be placed on Final Warning status. The final warning period shall end when the candidate has attained a GPA of 2.0000 and above in the following semester. By the end of the final warning status semester, if the candidate's GPA is less than 2.0000, then the candidate shall leave the programme.

A candidate on Final Warning status shall not be allowed to register for industrial training course.

12.3. Maximum Duration of Study

The maximum duration of study given to students shall be two times the minimum duration of the registered university Diploma programme based on the academic year of entry of the intake as specified in the programme structure.

However, students who have not fulfilled all the requirements for graduation at the end of their study may, at the discretion of the Board of Examiners, be allowed to resit / repeat all courses with grades below C, subject to the maximum time frame to graduate.

Notwithstanding the above, the President may, subject to the relevant regulations prevailing, grant extensions of the maximum duration. Students are required to submit an appeal for such an extension of the maximum time frame.

(Examination Regulations for the respective Diploma Programmes are available at TAR UMT Student Intranet).

12.4 Award of Diploma

Students shall fulfill all the requirements specified for the award of the Diploma as stated below:

(a) successfully completed and passed (unless exempted) all compulsory courses including core, cognate and co-curricular courses; AND

(b) achieved a minimum CGPA of 2.0000; AND

(c) fulfilled all the requirements of the University Regulations; AND

(d) paid all the fees due to the university.

Notwithstanding the above, the award of the Diploma shall be decided by the Senate in accordance to the constitution of the university.

12.5 Classification of Awards

[Applicable to July 2023 Year 1 Semester 1 New Intake in Academic Year 2023/2024]

	CGPA
Diploma with Distinction	3.6700 – 4.0000
Diploma with Merit	2.6700 – 3.6699
Diploma	2.0000 – 2.6699

(Examination Regulations for the respective Diploma Programmes are available at TAR UMT Student Intranet).

12.6 Extenuating circumstances which may affect a candidate's examination performance

(a) Candidates with extenuating circumstances, which may affect his/her examination performance or attendance at the examination, shall submit an appeal in writing within 48 hours from the occurrence of the extenuating circumstances to the Registrar. The appeal is subject to the University's Policy on Extenuating Mitigating Circumstances.

(b) The Registrar may, subject to Rule 7, and upon acceptance of such extenuating circumstances, exempt the candidate from Rule 8 (b) and permit a replacement examination of the affected course(s).

12.7 Appeal for Review of Examination Results

Candidates who wish to appeal for review of examination results may submit a formal online application for review of examination/ co-curricular results not later than one (1) week after the official release of results. A non-refundable processing fee per course shall be chargeable. The decision by the Senate shall be final. Candidates shall be able to view their appeal outcome in the Student Intranet.

12.8 Repeat/Resit Application

Students registering for repeat course(s) OR resit course(s) must register online. The deadline for registration of repeat/resit course(s) will be announced to students through the Student Intranet.

12.9 Online Course Registration / Add and Drop Courses

Only 'Active Status' students are given the option to register for add and drop for main / elective course(s) of current semester or outstanding / resit / repeat course(s). The online course registration portal is accessible for students in the first week of each semester via <https://reg.tarc.edu.my/> on Student Intranet. After registration is done in the first week, students shall print the bill and make payment from the second week (Monday) to the fourth week (Monday). Please refer to notices issued by the Department of Examinations and Credit Accumulation on add and drop course(s) criteria, duration of online registration, printing and payment of bill before commencement of each new semester.

12.10 Examination Requirements

(1) No candidate shall be admitted to an examination unless

(a) the candidate has paid all fees due; and

(b) has attended the relevant programme of study to the satisfaction of the Dean of Faculty concerned.

Failing to fulfil (a) and/or (b) above, the candidate shall be barred from sitting the examination.

(2) Candidates who do not meet the attendance requirements due to extenuating circumstances may appeal in writing to the Dean of Faculty/Head of Branch/Head of Centre for Nation Building and Languages no later than seven (7) calendar days from the date of the official notice of barring.

NB: Students are required to constantly refer to Intranet under Examination for Notices (e.g. registration for Resit/Repeat & co-curriculum etc); Information (e.g. examination regulation, awards, student discipline regulation etc) and other examination related matters.

12.11 Cheating in the Examination

Disciplinary action will be taken against any student who is found cheating or being dishonest or disobeying any instruction given by the Invigilator during the Examination. Disciplinary action may include immediate suspension from the whole Examination or remainder of that Examination. In addition, the student may be expelled by the University.

13. Bursary

13.1 Payment of Fees

Fees payable for newly register students must be paid before or on the date stipulated in the Letter of Offer.

Thereafter, fees payable at the beginning of each semester, unless otherwise specified, must be paid within two (2) weeks from the date of the commencement of the semester, failing which the students shall be withdrawn without further notification. For withdrawal due to non-payment of fees, the withdrawal date shall be the commencement date of the semester.

Payment of fees can be made through the following:

- a) Any branches of Public Bank Berhad counters; or
- b) Public Bank internet banking (www.pbepbank.com); or
- c) TAR UMT Bursary Office (payment via Public Bank debit card, Public Bank credit card, bank draft, bank cheque (upon request), cash (upon request), money order or postal order only) in favour of "TAR UMT".

Notwithstanding the above, if a student faces financial problem and is unable to pay the tuition fees on time, they may be allowed to extend the payment of fees or pay by installment provided that the student has submitted a written explanation, a copy of student bill, and supporting documents to the office of the Faculty before the stipulated deadline stated in the Student Bills.

In the instance where the student is a Perbadanan Tabung Pendidikan Tinggi Nasional (PTPTN) loan holder, and that there is a non-payment of tuition fees due to delay in banking of the loan into the student's account. The student must submit a completed Application Form for Extension of Payment to the Faculty office.

Payment after the due date of payment of fee shall be made via Public Bank debit card or in the form of bank draft only. A bank draft is not a receipt of payment made, it is a cash cheque purchased from the bank. The original bank draft should then be submitted to Bursary for payment.

13.2 Online Printing of Semester Tuition Fees

Students will be advised on the fees payable via notices displayed on the Faculty notice boards or TAR UMT website. Students shall print two (2) copies of the Student Bills via Student Intranet one (1) week before commencement of each semester. The onus is on the students to print the Student Bills and pay the fees before or by the stipulated deadline stated in the Student Bills, failing which it is deemed that the students would have withdrawn from TAR UMT. No late printing of bills will be entertained.

13.3 Refund of Fees

All fees paid are strictly non-refundable and non-transferable.

However, there is a Refund of Fees for newly registered students who withdraw if notification of withdrawal in writing is received before the commencement date of the programme. Fifty percent (50%) of the amount of Tuition Fee, Special Administration Fee, Examination Fee, Laboratory/Workshop Fee and Facilities & Resource Fee paid by the student may be refunded. Registration, Orientation and Activity Fees are strictly non-refundable. If notification of withdrawal in writing is received after the commencement date of the programme, there is strictly no refund of all fees paid. This applies to students who pay and register after commencement date of the programme upon withdrawal from the programme.

Caution money (less any liabilities) may only be refunded on application after a student has completed or withdrawn from his/her last programme of study at TAR UMT. The application for the refund shall be made within one (1) year from the date of completion of study or withdrawal from TAR UMT, failing which the said caution money shall be deemed as donation to the Student Loan Fund.

13.4 Fees for Resit Examination and Repeating Courses

Upon online registration for Resit and/or Repeat course(s), students shall print two (2) copies of the bills via Student Intranet. The onus is on the students to print the Resit and/or Repeat bills and pay the fees before or by the stipulated deadline stated in the Resit and/or Repeat bills. As a guide, payment of resit and repeat bills shall be made by week 5 of the 14 lecture-week semesters or by week 3 of 7 the lecture-week semester.

No late Printing of Bills and Payment of Fees will be entertained. The Resit and/or Repeat fees will not be refunded even if the student is absent from the examination.

14. Financial Aid

There are various types of loans available for all students to apply. The loans are meant to assist students who face financial difficulties in completing their studies in TAR UMT.

14.1 Scholarships, Bursary and Grants

- a) TAR UMT Merit Scholarship (No application is required, scholarship will be awarded automatically)
- b) The Star Education Fund Scholarship
- c) Nanyang Tertiary Education Fund Scholarship
- d) Sin Chew Daily Education Fund Scholarship
- e) TAR UMT for State/National Players
- f) Tan Sri Lee Loy Seng Foundation Scholarship
- g) S.P.Setia Foundation Scholarship
- h) Grants and awards by generous individuals
- i) Industry-Based Study Grants

14.2 Student Loans

There are various types of loans available for students to apply. The type of loans available are as follows:

- a) TAR UMT Student Loan Fund (Open for application in weeks 1-3 of May and September yearly)
- b) Perbadanan Tabung Pendidikan Tinggi Nasional (PTPTN) Loan
- c) Penang State Loan
- d) Perak State Loan
- e) Selangor State Loan
- f) Chang Ming Thien Foundation Loan
- g) KOJADI Study Loan
- h) Carlsberg Hua Zong Education Fund Loan

Please visit the website of TAR UMT or contact Department of Student Affairs (DSA) for more information about scholarships and financial assistance.

14.3 PTPTN

TAR UMT students may apply for PTPTN loan. Students are advised to read the notices and information about PTPTN announced by DSA regularly

15. Computer Services and Facilities

15.1 Communication and Information Technology (CIT) Centre

CIT Centre is situated in Cyber Centre, a three-storey building with a total built-up area of 100,000 square feet. It is designed to provide an ideal environment for student learning and social educational interaction. Seventeen (17) ICT laboratories and twenty one (21) discussion rooms are fully equipped with Internet connectivity to support training, e-learning, multimedia language learning, and a host of other teaching and learning activities (such as Microsoft and SPSS software). These laboratories, discussion rooms and the spacious atrium are furnished and designed to provide a conducive learning environment for students with different learning styles and preferences. The technology supported teaching environment caters for different teaching approaches and knowledge acquisition. This building houses a fast, reliable and comprehensive network infrastructure and various supporting utilities to enable effective and efficient development, operation, and maintenance of ICT facilities and services provided to all campuses.

The functions and services provided by CIT Centre are:

- a) Internet and Intranet Services
- b) Network, Hardware and Software Services
- c) Multimedia Services
- d) Teaching and Learning Technology Support

15.2 Computer Aided Design (CAD) Centre

Computer Aided Design (CAD) centre provides the necessary technical education base for FOET students to learn Computer Aided Design and Drafting (CADD), Computer Aided Engineering (CAE) as well as Computer Aided Management in line with industry requirements. The CAD Centre at Room D109 consists of over one hundred (100) computers. It serves the following activities:

- a) Design and Drafting (CADD) software such as AutoCAD, Revit AutoCAD
- b) Process and Control Design software such as MATLAB and SIMULINK
- c) Materials processing analysis software such as Moldflow Plastic Insight (MPI) and Anycasting simulation software.
- d) Electronic Circuit Design software such as PROTEL and Proteus VSM.
- e) 3D Mechanical Design & simulation software such as SolidWorks, Autodesk Inventor ©Professional.
- f) Material selection software.

16. Library

The Library aims to provide library resources and services to support the teaching, learning and research needs of TAR UMT.

16.1 Academic Resources

The Library has a total collection of over 220,000 volumes of printed books, over 300 titles of print + online serials and 10,600 units of electronic/audio-visual materials. It also provides access to an extensive range of remotely accessible online resources; local and international databases, electronic journals, e-books and CCH online publications.

Databases subscribed by the Library include ACM Digital Library, Ebrary, EBSCOhost Business Source Complete, Emerald, IOPscience, LawNet, Passport GMID, ProQuest Research Library and ProQuest Science Journals.

16.2 Facilities and Services

The Library caters for individual and collaborative work, with over 2,200 seats. Students have access to outstanding facilities for their academic work and study that include study carrels, individual study rooms, discussion rooms, reading rooms, audio visual room, Internet PCs, Wi-Fi access and many more.

The Library provides a number of services including loan services, reference services, self-service borrowing, user education programmes, interlibrary loan services, photocopying services, etc. Registered faculty, staff and students can search the library holdings, gain direct access to the full-text of electronic database and renew/reserve items at anytime, anywhere via Web OPAC (InfoWeb-Online Catalogue).

16.3 Library Induction Programme

The Library conducts a number of user education programmes, comprising:

- i. Library induction programme
The library induction programme is conducted during new intake time. It aims to introduce new students to the collections, services and facilities offered by the library. The programme comprises a PowerPoint presentation and a library-guided tour.
- ii. Library training sessions
The Library offers training sessions to users to equip them with the skills in information searching using library online catalogue and subscribed online databases, e-journals, e-books, etc.

The training sessions covers the following topics:

- i. Library InfoWeb
- ii. Online Resources Searching Skills

16.4 Opening Hours

The opening hours of the Library are as follows:

Day	Normal Days	Examination Period	Semester Holidays
Mondays - Fridays	8.30am - 9.00pm	8.30am - 9.00pm	8.30am - 7.00pm
Saturdays	9.00am - 2.00pm	8.30am - 5.00pm	9.00am - 2.00pm
Sundays	-	9.00am - 5.00pm	-

17. Student Services

17.1 Accommodation

Information on rooms available is regularly disseminated on notice boards maintained by DSA.

TAR UMT students are able to find accommodation in the nearby housing estates which are within easy reach of TAR UMT campus, such as:

- Taman Bunga Raya
- Taman Sri Rampai
- Taman Melawati
- Taman Danau Kota
- Jalan Genting Kelang
- Wangsa Maju
- Setapak Indah
- Wangsa Melawati
- Taman Desa Setapak
- Setapak Jaya
- Taman Melati

Students shall sign a tenancy-agreement with the landlord. It is important that the terms and conditions of the agreement should be clearly stipulated so as to avoid any misunderstanding. Copies of information sheets, "Guidelines on Tenancy Agreements" and "Sample of Tenancy Agreement" are available at the DSA upon request.

17.2 TAR UMT Campus Hostel Accommodation

TAR UMT campus hostel accommodation is available and situated on a 6-acre land. It consists of 10 blocks of 5-storey building with 1,000 rooms which can accommodate 2,000 students. Hostel availability is based on first-come-first-served basis. Students may apply for the hostel only after receiving TAR UMT Offer Letter and having paid the full fees. Please visit the website of TAR UMT or contact DSA for more information about hostel accommodation.

17.3 Sport and Recreation

The outdoor sports facilities available are:

- a) One sports field comprising one soccer pitch, jogging track and two netball courts
- b) One futsal court
- c) One handball court
- d) One dodgeball court
- e) Two volleyball courts
- f) Three basketball courts

17.4 Sport Complex and Clubhouse

The facilities and their operational hours are as follows:

Facilities	Operational Days	Operational Hours
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Sports Complex 1 gymnasium 2 multi-purpose halls 3 rooftop tennis courts 6 table tennis courts 6 badminton courts/2 volleyball courts/1 basketball court	Mondays - Fridays Saturdays & Sundays	9.00am - 9.00pm 9.00am - 7.00pm
Clubhouse 2 gymnasiums 2 squash courts An Olympic-sized swimming pool A learner's swimming pool 1 snooker table	Mondays - Fridays Saturdays Sundays	9.00am - 9.00pm 9.00am - 12.00noon 3.00pm - 7.00pm 3.00pm - 7.00pm

17.5 Canteen Facilities

Reasonably priced meals, snacks and refreshments are available at the canteens. The canteens are located at Block G (Red Bricks Cafeteria), Block L (Yum Yum Cafeteria), Garden Cafe at Cyber Centre, Casuarina Cafe (Block SC, East Campus), Richiamo Coffee (Block SC, East Campus) and The Roots Cafe (Block L). Their operational hours are as follows:

Red Bricks Cafeteria Yum Yum Cafeteria Garden Café Casuarina Cafe	Richiamo Coffee	The Roots Cafe
Mondays - Fridays 8.00am - 5.00pm	Mondays - Fridays 7.30am - 10.00pm	*Open hours will be posted at https://www.facebook.com/TheRootsRestaurant/
Saturdays 8.00am - 3.00pm	Saturdays 7.30am - 10.00pm	

17.6 University Bus Services

TAR UMT maintains a regular bus service which ferries students between the campus and the following nearby residential areas:

- Taman Desa Setapak • Taman Sri Rampai • Melati Utama
- Wangsa Maju • Jalan Genting Kelang • PV10, PV12, PV13, PV15, PV16

The buses operate daily, as follows:

Day	Normal Days	Semester Holidays
Mondays - Fridays	7.15am - 9.30pm	Will be adjusted accordingly
Saturdays	7.15am - 2.00pm	
Sundays & Public Holidays	-	-

TAR UMT bus service makes it very convenient for students to commute between the campus and nearby housing areas. Besides operating a daily bus service along the defined routes, TAR UMT also provides bus services for field trips, educational visits and tours organised by the students.

17.7 Students' Insurance Scheme

A 'Student Personal Accident Insurance Scheme' insures all students of TAR UMT. The policy will cover the students for accidents round the clock, anywhere in the world. The sum insured is RM60,000 for death or total disablement. In the event of death of the policy holder, funeral expenses not exceeding RM5,000 would also be paid.

In addition, students can also claim for medical treatment up to a maximum of RM5,000 and/or RM500 for traditional treatment per year (registered medical practitioners only) for injuries sustained in an accident. Copies of the Insurance Policy's terms and conditions are available at the DSA for reference.

17.8 Student Counseling Services

A team of counselors is available to help students with emotional, personal or academic concerns through individual counseling sessions, group counseling sessions, workshops and seminars. The

counselling services are strictly confidential. All individual and group counselling services are free of charge. Counselling services are available to students during office hours at the DSA.

17.9 Student Development and Career Services

Student Development and Career Services (SDCS) offers uniquely designed life programmes that are central to a student's personal and career growth. Some of SDCS specially crafted programmes are:

- a) "Your Leadership DNA" gives students the tools necessary to attain true leadership quality.
- b) "The Road to Excellence" has been designed to enhance students' resiliency and learning agility.
- c) ENACTUS TAR-UC provides students a very unique platform to develop themselves by helping the communities that are in need.
- d) Career Development Workshops & Talks throughout the semester to help students to be aware of present day industries' requirements. The career development workshops are conducted by counsellors, recruitment firms and professional organizations who would guide students in the identification of skills, interests, values and how to make appropriate career decisions with confidence and maximise their employability opportunities.

Some of the Career Talks or Workshops are:

- Company Talks
- Creating Your Future Workshop
- Personality, Goal Setting & Career Profiling Workshops
- Resume Writing & Interviewing Skills Workshops
- Leadership Camp
- Career Decision Making
- Career Fairs

17.10 Clubs, Societies and Committees

It is compulsory for students to join and participate in student academic society of the programme of study.

Advisors and Assistant Advisors will be appointed to guide and advise the students in the societies' activities.

Notwithstanding the above, students are strongly encouraged to join and participate in other clubs and committees for their personal development. Please refer to TAR UMT website (www.tarc.edu.my) for a complete list of clubs, societies and committees.

17.11 Study Abroad Unit (SAU)

The University has entered into various progression and articulation arrangements with universities overseas for both undergraduate and postgraduate studies. SAU provides you with useful information and the academic counselling to ensure you get the best out of your plans to study abroad. For further enquiries, students may visit the Study Abroad Unit (SAU) located at the Centre for Continuing and Professional Education (CPE Centre).

18. Personal Data Protection Act (PDPA) Statement

Please note that your Faculty, lecturer or tutor may transmit your personal data to your parents, guardians, potential employers and / or trainers for the purposes of industrial training or otherwise your programme's learning outcome requirement during the course of this programme for any one or more of the following purposes:

- a) In matters relating to your studies of this course and / or
- b) In matters relating to your academic and disciplinary matter of this programme.

19. Miscellaneous

Students must note that upon registering as students of TAR UMT through payment of fees, they are to abide and comply with all the student code of conduct, rules and regulations of TAR UMT. These include payment of fees, attendance of classes, examinations, and comply with all rules. It is the responsibility of students to familiarise themselves with this code of conduct, rules and regulations. Any breach of the same may lead to disciplinary action.

Part B. Programme specific information

Diploma in Manufacturing Technology

Manufacturing technology encompasses software-based systems, material forming equipment and processes, material removal tools and processes, tooling systems, automated systems and additive processes etc. It refers to any technology that shapes or influences the manufacturing processes. Manufacturing processes are defined as all the activities involved in translating raw materials into finished products through the use of labour, machinery, chemicals, formulation methods, or biological processes. This diploma aims to produce graduates with a sound foundation in manufacturing technology field. Graduates are equipped with the knowledge which are essential for their future employment.

1. Programme Aims

The Diploma in Manufacturing Technology aims to equip students with a comprehensive foundation in manufacturing processes and technologies, including software systems, material forming and removal processes, tooling systems, and automation. Graduates will be prepared to translate raw materials into finished products through various technological methods, ensuring they possess the technical knowledge and practical skills required for successful careers in manufacturing technology. The program also emphasizes lifelong learning, professionalism, and ethical practices to contribute effectively to the industry and society.

Career Prospects:

Diploma graduates may be employed in a wide variety of manufacturing industries such as iron & steels, petrochemicals, electronics, ceramics, polymers, composites, automotive and aerospace industries as assistant engineers, metallurgical technician, quality control technician, service technician, testing technician, production technician, sales & marketing executive. Diploma graduates also can pursue further study in the relevant Bachelor of Technology programme.

2. Programme Educational Objectives (PEO)

The programme objectives describe the expected achievements of the Manufacturing Technology programme graduates in their career and professional life a few years after their graduation.

The programme objectives are as follow:

1. Graduates are competent technicians in the field of manufacturing technology.
2. Graduates are engaged in lifelong learning and professional development.
3. Graduates are committed to professionalism in technologists' practices and contribute to the society.

3. Programme Learning Outcomes (PLO)

The Programme Learning Outcomes are statements that describe what students are expected to know and be able to perform or attain by the time of graduation in relation to the skills, knowledge and behaviour that students acquire through the Diploma in Manufacturing Technology programme. All technology programmes in the faculty have adopted the Outcome Based Education (OBE) approach in their teaching and learning methodology in accordance to the MBOT accreditation requirements.

The NINE programmes outcomes derived from the program objectives are:

- PO1 **Knowledge** – Demonstrate knowledge in mathematics, science and technology fundamentals in manufacturing technology field to deal with well-defined work procedures and practices.
- PO2 **Practical Skills and High Technology** – Adopt technical, practical-oriented skills and use of modern tools and technologies to resolve well-defined problems in the context of manufacturing technology.
- PO3 **Analytical, Critical Thinking and Scientific Approach** – Able to identify, formulate and solve well-defined technical problems in manufacturing technology and resolve through scientific investigation, experimentation and/or application of digital and numeracy skills.

- PO4 **Communication Skills** – Able to apply interpersonal and presentation skills either orally or in written form with the technologist communities and society
- PO5 **Social Responsibility in Society and Technologist Community** – Able to assess issues of cultural, environmental, safety, health, sustainability in context of technological development and meeting the societal responsibility in their work practices.
- PO6 **Lifelong Learning and Information Management** – Acknowledge the need for and engage in continuous, independent and lifelong learning in the context of manufacturing technological change.
- PO7 **Technopreneurship and Management Skills** – Demonstrate awareness of management, business practices and technopreneurship practices.
- PO8 **Ethics and Professionalism** – Understand and commit to professional ethics, responsibilities and norms of technology practices
- PO9 **Teamwork and Leadership** – Function efficiently as an individual and in diverse team-based work and possess capacity to lead.

4. DISCLAIMER

The information here is correct at the time of publishing. Notwithstanding the above, TAR UMT reserves the right to amend, alter or otherwise change any of the information, facts, regulations and rules contained herein and without prior notice. Students shall refer to the notice boards, Intranet, and TAR UMT website (www.tarc.edu.my) for the latest information.

PROGRAMME STRUCTURE

Year 1 Semester 1 (Jul 2024)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AJEL1523	INTEGRATIVE ENGLISH	3	100:0	0	28	0	0	Compulsory	nil	Y	Y
AGGT1113	FUNDAMENTAL MATHEMATICS	3	40:60	28	21	0	0	Compulsory	NIL	Y	Y
AGMP1123	MEASUREMENT AND WORKSHOP TECHNOLOGY	3	100:0	14	0	42	0	Core	NIL	Y	Y
AGMP1313	MATERIALS SCIENCE	3	50:50	28	0	28	0	Core	NIL	Y	Y
AGMP1143	COMPUTER PROGRAMMING	3	50:50	14	0	56	0	Core	NIL	Y	Y
AGMP1124	PHYSICS FOR TECHNOLOGIST	4	50:50	28	21	21	0	Core	Nil	Y	Y
Total:		19									

Year 1 Semester 2 (Nov 2024)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AJEL2513	PROGRESSIVE ENGLISH	3	100:0	0	28	0	0	Compulsory	NIL	Y	Y
AGGT1213	MATHEMATICS FOR TECHNOLOGIST	3	40:60	28	21	0	0	Compulsory	NIL	Y	Y
MPU-2342	INTEGRITY AND ANTI-CORRUPTION	2	100:0	0	14	0	0	Compulsory	Nil	Y	Y
Total:		8									

Year 1 Semester 3 (Feb 2025)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AGMF1253	POLYMER TECHNOLOGY	3	50:50	28	0	28	0	Core	NIL	Y	Y
AGMF1332	CASTING TECHNOLOGY	2	50:50	14	0	28	0	Core	Nil	Y	Y
AGMF1343	FUNDAMENTAL OF GREEN MANUFACTURING	3	50:50	28	0	28	0	Core	NIL	Y	Y
AGMP1233	WELDING TECHNOLOGY	3	100:0	0	0	56	0	Core	NIL	Y	Y
AGMP1243	ELECTRIC CIRCUITS	3	50:50	28	14	21	0	Core	NIL	Y	Y
AGMP1252	COMPUTER-AIDED DESIGN AND DRAFTING	2	100:0	0	0	28	0	Core	NIL	Y	Y
Total:		16									

Year 2 Semester 1 (Jul 2025)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AGMP2113	SOLID MODELLING AND 3D PRINTING	3	100:0	0	0	70	0	Core	NIL	Y	Y
AGMF2173	METAL MANUFACTURING TECHNOLOGY	3	50:50	14	0	42	0	Core	NIL	Y	Y
AGMF2192	MECHANICAL TESTING	2	50:50	14	0	28	0	Core	NIL	Y	Y
AGMP2143	CNC PROGRAMMING AND CAM	3	100:0	14	0	56	0	Core	NIL	Y	Y
AGMP2153	PROJECT MANAGEMENT AND FINANCE	3	100:0	28	0	14	0	Core	NIL	Y	Y
AGMP2163	INDUSTRIAL AUTOMATION	3	50:50	28	0	35	0	Core	NIL	Y	Y
Total:		17									

Year 2 Semester 2 (Nov 2025)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
MPU-2282	CIVIC CONSCIOUSNESS AND VOLUNTEERISM	2	100:0	0	14	0	0	Compulsory	Nil	Y	Y
AGMP2312	ETHICS AND PROFESSIONALISM	2	100:0	14	14	0	0	Core	NIL	Y	Y
MPU-2173	PENGHAYATAN ETIKA DAN PERADABAN	3	100:0	0	14	0	0	Compulsory	Nil	Y	Y
Total:		7									

Year 2 Semester 3 (Feb 2026)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AGMF2382	HEAT TREATMENT	2	50:50	14	0	28	0	Core	Nil	Y	Y
AGMF2393	COMPOSITE AND CERAMICS TECHNOLOGY	3	50:50	14	0	42	0	Core	NIL	Y	Y

Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AGMF2302	NDT & MATERIALS CHARACTERISATION	2	50:50	14	0	28	0	Core	Nil	Y	Y
AGMP2242	QUALITY AND SAFETY	2	50:50	28	7	0	0	Core	NIL	Y	Y
AGMF2256	FINAL YEAR PROJECT	6	100:0	3	0	72	0	Core	AGMP2153 PRO.	Y	Y
	CO-CURRICULAR	2						Compulsory			
Total:		17									

Year 3 Semester 1 (Jul 2026)											
Course Code	Course Title	Credit Hrs	CW:EX	L	T	P	O	Type	Pre-req	Credit Bearing	CGPA Bearing
AGMF3118	INDUSTRIAL TRAINING	8	100:0	0	0	570	5	Core	Nil	Y	N
Total:		8									

Total credit hours:92

DGT202405



Course List

<u>Course Number</u>	<u>Course Code and Title</u>
1	AJEL1523 INTEGRATIVE ENGLISH
2	AGGT1113 FUNDAMENTAL MATHEMATICS
3	AGMP1123 MEASUREMENT AND WORKSHOP TECHNOLOGY
4	AGMP1313 MATERIALS SCIENCE
5	AGMP1143 COMPUTER PROGRAMMING
6	AGMP1124 PHYSICS FOR TECHNOLOGIST
7	AJEL2513 PROGRESSIVE ENGLISH
8	AGGT1213 MATHEMATICS FOR TECHNOLOGIST
9	MPU-2342 INTEGRITY AND ANTI-CORRUPTION
10	AGMF1253 POLYMER TECHNOLOGY
11	AGMF1332 CASTING TECHNOLOGY
12	AGMF1343 FUNDAMENTAL OF GREEN MANUFACTURING
13	AGMP1233 WELDING TECHNOLOGY
14	AGMP1243 ELECTRIC CIRCUITS
15	AGMP1252 COMPUTER-AIDED DESIGN AND DRAFTING
16	AGMP2113 SOLID MODELLING AND 3D PRINTING
17	AGMF2173 METAL MANUFACTURING TECHNOLOGY
18	AGMF2192 MECHANICAL TESTING
19	AGMP2143 CNC PROGRAMMING AND CAM
20	AGMP2153 PROJECT MANAGEMENT AND FINANCE
21	AGMP2163 INDUSTRIAL AUTOMATION
22	MPU-2282 CIVIC CONSCIOUSNESS AND VOLUNTEERISM
23	AGMP2312 ETHICS AND PROFESSIONALISM
24	MPU-2173 PENGHAYATAN ETIKA DAN PERADABAN
25	AGMF2382 HEAT TREATMENT
26	AGMF2393 COMPOSITE AND CERAMICS TECHNOLOGY
27	AGMF2302 NDT & MATERIALS CHARACTERISATION
28	AGMP2242 QUALITY AND SAFETY
29	AGMF2256 FINAL YEAR PROJECT
30	AGMF3118 INDUSTRIAL TRAINING

1.	Name of Course :	INTEGRATIVE ENGLISH														
	Course Code :	AJEL1523														
2.	Synopsis :	This course will expose students to the fundamentals of listening, speaking and reading skills, as well as basic foundation in grammar and vocabulary to enhance their language proficiency and enable them to cope with their studies in English at tertiary level.(CEFR B1)														
3	Credit Value :	3														
4	Prerequisite/co-requisite: (if any)	nil														
5	Course Learning Outcomes (CLO) :															
	CLO1	Present themes, messages or main points based on selected videos. (A2, PLO9)														
	CLO2	Explain the use of grammar components in various texts. (A3, PLO9)														
	CLO3	Present personal views based on the content of selected articles. (A2, PLO9)														
	6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
			PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
		CLO 1									✓					
CLO 2										✓						
CLO 3									✓							
7	Course Content Outline															
	Grammar: - Subject Verb Agreement (SVA): - Agreement of Verb with Subject - Agreement of Verb with Determinative - Agreement of Verb with Collective and Uncountable Nouns - Agreement of Pronouns - Tenses: - Simple Present - Present Continuous - Simple Past - Past Continuous - Present Perfect - Past Perfect															

	<p>Listening and Speaking Skills:</p> <ul style="list-style-type: none"> - Orientating yourself to the text - Predicting the situation - Listening to understand context - Listening for specific information - Listening for contrasting ideas - Listening for examples - Listening for reasons and explanations - Listening for cause and effect - Distinguishing the relevant from the irrelevant information - Predicting types of words needed - Identifying main ideas - Identifying details - Understanding stress and intonation - Identifying speaker's views, attitudes, and opinions - Identifying facts and opinions - Making inferences and drawing 	
	<p>Reading and Vocabulary Skills:</p> <ul style="list-style-type: none"> - Skimming and scanning for main idea(s) - Identifying details and examples to support an argument - Making inferences and predictions based on information in the text - Identifying the purpose of a paragraph or text - Distinguishing fact from opinion - Interpreting text for author's, intention, attitudes and style - Inferring meaning from unfamiliar words - Analysing prefixes and suffixes - Deducing meaning from context 	
	<p>Writing Skills</p> <ul style="list-style-type: none"> - Spelling and punctuations - Writing simple sentences - Introduction to different types of writing 	
8	<p>References (include required and further readings, and should be the most current)</p>	<ol style="list-style-type: none"> 1. Gaudart, H., Hughes, R., Michael, J. & Yong, L.C. (2019). Towards Better English Grammar (3rd ed.). Oxford Fajar Sdn Bhd. 2. Stephenson, H., Dummett, P. & Hughes, J. (2019). Life Intermediate Student's Book (2nd ed.). Cengage Learning Singapore. 3. Barker, A. (2019). Improve Your Communication Skills: How to Build Trust, Be Heard and Communicate with Confidence (5th ed.). Kogan Page.

1.	Name of Course :	FUNDAMENTAL MATHEMATICS													
	Course Code :	AGGT1113													
2.	Synopsis :	This course covers algebra, trigonometry and complex number. Skills are needed to deal with applications in the related engineering disciplines.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Solve algebraic problems. (C3)													
	CLO2	Solve trigonometrical problems. (C3)													
	CLO3	Solve mathematical problems involving complex numbers. (C3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2	✓													
	CLO 3	✓													
	7	Course Content Outline													
Algebra <ul style="list-style-type: none">• Indices, common logarithms, surds.• Elementary properties of quadratic equations and functions.• Solution of exponential equations of the form.• Solution of simultaneous linear equations with up to three unknowns by successive eliminations.• Simple simultaneous equations, at least one non-linear, in two unknowns.• <u>Linear law and non-linear relations</u>															
Trigonometry <ul style="list-style-type: none">• Circular measure, trigonometric of angles of any magnitude.• Periodicity and graphs of circular functions, Inverse function.• Applications to multiple angles and simple identities.• Easy trigonometrical equations, Solution of triangles, the half-angle formulae.															
Complex numbers <ul style="list-style-type: none">• Complex numbers: algebraic, trigonometric and exponential forms.• Real and imaginary parts.• Modulus and argument.															
8	References (include required and further readings, and should be the most current)	Main references supporting the course 1. Glyn James (2020) Modern Engineering Mathematics, 6th Edition, Pearson. 2. A. J. Washington (2018) Basic Technical Mathematics with Calculus, 11th edition, Pearson.													

1.	Name of Course :	MEASUREMENT AND WORKSHOP TECHNOLOGY													
	Course Code :	AGMP1123													
2.	Synopsis :	This course covers concept and skills of using measurement instruments and gauges for measurement of linear and angular measurement, form measurement, miscellaneous measurements, limits fits and tolerances, metrology of machine tools and measurement of mechanical parameters. Skills to operate workshop machineries including use of hand tools, milling machine, lathe machine, drilling machine and grinding machine to industry standards are included.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Perform measurements using various types of measuring instruments used by industries in manufacturing processes. (P4)													
	CLO2	Identify the structure and components of various cutting machines used by industry in manufacturing processes. (C1)													
	CLO3	Operate various types of cutting machines machines that meet industry requirements. (P3)													
	CLO4	Identify quality assurance, testing, commissioning, and commissioning needs. (C3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1		✓												
	CLO 2	✓													
	CLO 3		✓												
	CLO 4			✓											
7	Course Content Outline														
Industrial Safety: Mechanical accidents, electrical accidents, safety devices. Safety operating procedures Care and order in the workshop. Safety precautions. Industrial Safety and Healthy Act 1994.															
Accuracy of measuring instruments, calibration and traceability of standard for measuring instruments Dimensional tolerances and layout Working principles and measurement for one dimensional measuring instrument (i.e. micrometres, callipers, dial indicators).Two dimensional measurements: i.e. checking of angles, hole to hole distance, pitch distance, measurement of hole positions.															
Applications of Digital tools and linear scale. Concept and measurement of : • Linear and Angular • Flatness, straightness and squareness • Roundness and cylindricity • parallelism and concentricity • Surface roughness • Temperature, pressure and sound intensity • Gap, radius, alignment and screw threads • Screw threads and hardness • GO and NO-GO gauges • Profile projector, optical counter projectors															
Profile measurement: Profile projector, optical counter projectors															

	<p>Principles of cutting tools and cutting technology Rake and clearance. Cutting tools, tool life and tool wear, force on tools, chips, fluids and coolant, heat produced during cutting operation</p> <p>Drilling machines Drill: types, parts and functions, drill angle and grinding of drill. Drilling process; drilling of an ordinary hole, countersinking; counter boring, spot facing etc. Drilling machines; types, parts and functions Cutting speed and feed. Set up and holding of work piece while drilling. Cutting fluid: types and uses. Safety precautions. Shaping machine: Main features and driving mechanism. Use of clapper box and tools, machining inclined surfaces.</p> <p>Milling machine: Types and functions of main parts. Various milling operations, gang milling, facing, profiling, indexing, and milling cutters. Various adjustments, step and slot, feeds and cutting speeds. Safety precautions</p> <p>Grinding machine: Types and uses. Grinding wheel: types and uses, specifications, balancing, dressing, fixing and truing of wheels. Safety precautions</p> <p>Lathe machine: Types, main parts and functions. Operations between centres face plates, chucks. Cutting tools, angles, shapes, and materials. Other operation: Making of a thread, boring, drilling knurling. Cutting speeds and feeds and cutting external threads. Safety precautions</p>
8	<p>References (include required and further readings, and should be the most current)</p> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Kalpakjian, S. (2019) Manufacturing. Engineering and Technology, 8th Edition Prentice Hall 2. Raghavendra and Krishnamurthy. (2017), Engineering Metrology and Measurements, Oxford University Press. 3. Levu O'Brein. (2017), Manufacturing Engineering and Technology. Larsen and Keller Education <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Bewoor. (2009), Metrology & Measurement, Tata McGraw-Hill Education. 2. Khurmi, R.S. & Gupta, J.K. (2009), Textbook of Workshop Technology: Manufacturing Processes, S. Chand, New Delhi 3. Kalpakjian, S. & Schmid, S. R. (2008), Manufacturing Processes for Engineering Materials, Pearson/Prentice Hall, Singapore 4. R. Kibbe, Warren T. White and Roland O Meyer, Kelly Cuttsn, Jon Stenerson. (2014), Machine Tool Practises, 10th, Prentice Hall 5. Richard Kibbe, Roland Meyer, Warren White, John Neely, Jon Stenerson and Kelley Curran. (2015), Machine Tool Practices 10th edition, Pearson.

1.	Name of Course :	MATERIALS SCIENCE													
	Course Code :	AGMP1313													
2.	Synopsis :	This course covers the topics which include mechanical, electrical and thermal properties, metals, polymers, ceramics and composites as well as corrosion and degradation of materials.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Elucidate the structure and properties of various metallic and non-metallic materials (C2, PLO1)													
	CLO2	Predict the appropriate materials for specific application. (C3, PLO1)													
	CLO3	Follow experimental techniques to investigate material structure and properties. (P3, PLO2)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2	✓													
	CLO 3		✓												
7	Course Content Outline														
	Material Classification:														
	Influence of atomic structure and bonding on the structure and properties of materials.														
	Structure:														
	• Crystalline, glassy, and amorphous structures.														
	• Phase diagrams: single phase and multiphase, use of phase diagrams to predict structure and properties.														
	• Influence of grain size and phase distribution on properties.														
	Mechanical Properties:														
	Strength, elasticity, plasticity, hardness, toughness, ductility.														
	Electrical Properties:														
• Conductivity and resistivity, intrinsic and extrinsic semiconductors, the p-n junction .															
Metals, and Non-Metals:															
Properties and typical applications of each group of materials.															
Advanced Materials:															
Smart materials															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course:</p> <ol style="list-style-type: none"> 1. Callister, W.D.,(2021) Fundamentals of materials science and engineering, 6th Edition, Wiley,Hoboken, NJ. 2. Donald, R. Askeland, (2019), Essentials of materials science and engineering, 4th Edition, Cengage Learning. <p>Additional references supporting the course:</p> <ol style="list-style-type: none"> 1. Smith, W.F., (2019), Foundations of Materials Science and Engineering, 6th Edition, McGraw Hill, New York. 2. Michael Ashby, Hugh Shercliff, and David Cebon. Materials : engineering, science, processing and design (2019), 4th Edition, Oxford : Butterworth-Heinemann, Elsevier.
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1.	Name of Course :	COMPUTER PROGRAMMING													
	Course Code :	AGMP1143													
2.	Synopsis :	This course introduces students to a structured approach to programming using C++ and to explore applications of the C++ programming language in engineering and technology.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Encode the devised solutions to simple computing problems into													
	CLO2	Interpret the operation of simple computer programs . (C3)													
	CLO3	Write well-structured computer programs (C3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1		✓												
	CLO 2			✓											
	CLO 3			✓											
7	Course Content Outline														
Fundamental of C++ Programming: Introduction to the fundamental of programming language and the development processes using the C++ compiler. Familiarization with Microsoft Visual C++ execution procedures.															
Data types and variables Study of C++ data types and variables, variable declarations, operators and expressions used in C++.															
Operators and expression: Arithmetic, relational, logical, assignment and other operators. Study of the various expressions used in conjunction with the operators.															
Control Structure (Selection): Control structure statements and blocks such as IF statements, ELSE statements, MULTIPLE IF statements, SWITCH statements.															
Control Structure (Repetition): Control structure statements and blocks such as FOR loop, NESTED FOR loop. Control Structure (Repetition): Control structure statements and blocks such as WHILE loop, DO WHILE loop.															
Functions: Functions and program structure. The syntax and concepts of using functions, parameter passing, external variables and the scope of the variables. Functions: Make function call by value and by reference. Use of standard header files and user defined header files.															
Pointers and Arrays: Study of one dimensional arrays and multi-dimensional arrays.															
Pointers and Arrays: Passing array to function Pointers and Arrays:															
Advance Input and output: Standard I/O in C++															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Slobodan Dmitrovic, (2020), Modern C++ for Absolute Beginners, Apress 2. D. S. Malik, (2018), C++ Programming: Program Design Including Data Structures, 8th Edition, Cengage Learning <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. P. J. Deitel, H. M. Deitel, (2017), C++: How to program, 10th Edition, Pearson 2. D. S. Malik, (2018), C++ programming: from problem analysis to program design, 8th Edition, Cengage Learning
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1.	Name of Course :	PHYSICS FOR TECHNOLOGIST													
	Course Code :	AGMP1124													
2.	Synopsis :	This course covers the application of the kinematics, circular motion, simple harmonic motion, force and Newton’s law, work and energy, momentum, rotational kinematics and dynamics, velocity diagrams. It also covers the basic concepts and laws of thermodynamics and fluid processes.													
3	Credit Value :	4													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Apply principle of mechanics to solve mechanical related problems. (C3)													
	CLO2	Apply principles of thermodynamics and fluid mechanics to solve thermodynamics and fluid mechanics related problems. (C3)													
	CLO3	Measure experimental data with guided procedures (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2	✓													
	CLO 3		✓												
7	Course Content Outline														
Introduction															
• Application of quantity physics and units in the context of mechanics.															
Mechanics - Kinematics:															
• Displacement, speed, velocity and acceleration															
Mechanics - Circular Motion:															
• Uniform circular motion															
• Centripetal acceleration															
Mechanics - Simple Harmonics Motion(SHM):															
• The ideal spring and SHM															
• SHM and the reference circle															
Mechanics – Forces and Newton’s Laws:															
• Newton’s Law of motion															
• Newton’s Universal Gravitational Law															
Mechanics - Work and Energy:															
• Work done by constant force															
• Work-energy theorem and kinetic energy															
• Potential energy															
Mechanics - Momentum and Collisions:															
• Momentum															
Mechanics - Rotational Kinematics and Dynamics:															
• Angular displacement, angular velocity and angular acceleration															
• Equations of rotational kinematics															
• Torque															
• Moment of inertia															
• Rigid object in equilibrium															
• Newton’s second law from rotational motion															

	<p>Thermodynamic:</p> <ul style="list-style-type: none"> • Introduction to the fundamentals of thermodynamics, terminology, properties, processes, cycles and international sign convention. • Definition of work, heat and power • First Law of Thermodynamics and colloralties • Thermodynamic system – close and open systems, cycles .Non-Flow Energy Equation (N.F.E.E) and Steady Flow Energy Equation. (S.F.E.E.) • Perfect gas and its application
	<p>Fluid Mechanics:</p> <ul style="list-style-type: none"> • Basic concepts of Fluid mechanics. Density, specific weight, specific gravity and Archimedes Principle • Fluid pressure and manometry • Hydrostatic forces on submerged plane, centre of gravity, centre of pressure • Energy and momentum balances in 1- dimensional systems. Continuity, Bernoulli and Energy Equations and its applications.
8	<p>References (include required and further readings, and should be the most current)</p> <div> <p>Main references supporting the course</p> <p>1. David Young, Shane Stadler, (2022), Physics, 12th Edition, John Wiley & Sons Inc., Hoboken, New Jersey.</p> <p>Additional references supporting the course</p> <p>1. Hugh D. Young and Roger A. Freedman, (2020), Sears and Zemansky's University Physics with Modern Physics, 15th Edition, Pearson, Harlow, Essex</p> <p>2. Raymond A. Serway, Chris Vuille, (2018), College Physics, 11th Edition, Cengage Learning, Boston</p> </div>

1.	Name of Course :	PROGRESSIVE ENGLISH													
	Course Code :	AJEL2513													
2.	Synopsis :	This course is designed to help students to develop their spoken and written communication skills in English for the tertiary level in preparing them for the real world. (CEFR C1)													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Demonstrate the use of correct sentence structures, grammar and vocabulary in written communication. (A3, PLO9)													
	CLO2	Respond persuasively and critically to job related questions in correct sentence structures, grammar and vocabulary. (A2,PLO9)													
	CLO3	Prepare a writing portfolio using the writing process approach. (A4, PLO9)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1									✓					
	CLO 2									✓					
	CLO 3									✓					
7	Course Content Outline														
<p>Speaking Skill</p> <ul style="list-style-type: none">•Using appropriate adjectives to describe personalities during a job interview. (Proper Adjectives and Descriptive Adjectives: Regular and Predicate)•Using action verbs to describe job responsibilities.•Answering questions in a job interview using appropriate tenses. (Simple Past, Simple Present, Present Continuous and Simple Future) Using grammatical correct language for reporting.•Using varied sentence structures for a report.•Using passive and active sentences in a report.•Using appropriate verbal phrases to discuss issues critically. (participial phrase)•Using persuasive devices in a group discussion.• Language functions for group discussion															
<p>Listening Skill</p> <ul style="list-style-type: none">•Listening for specific information during a job interview.•Listen to understand context in a job interview•Revisiting subject verb agreement•Listening for specific information in a report.•Listening to understand context in a report.•Summarising information in a report.•Identifying adverbs in a report															
<p>Reading and Vocabulary Skills</p> <ul style="list-style-type: none">•Scanning for main ideas in a blog.•Inferring meaning of unfamiliar words in a blog.•Making inferences and predictions based on information in a blog.• Deducing meaning from context•Identifying details and examples to support an argument.•Scanning for main ideas in an email.•Inferring meaning (Vocabulary) of unfamiliar words in an email.•Making inferences based on information in an email.															

	<p>Writing Skill</p> <ul style="list-style-type: none"> •Introducing reflective writing (Analytical practice where the writer describes an event/scene/thought and adds a personal reflection on its meaning) •Gathering information for writing purposes. •Planning an outline. •Using cohesive devices in report writing. •Presenting both sides of an issue in a feature article. •Revisiting sentence structures •Organising and developing ideas for email writing. •Applying appropriate English expressions in formal emails and letters. •Revisiting phrasal verb • Argumentative essay 	
8	References (include required and further readings, and should be the most current)	<ol style="list-style-type: none"> 1. Dwyer, J. (2020). The Business Communication Handbook (11th ed.). Cengage Learning Australia. 2. Kolin P. C. (2022). Successful Writing at Work (11th ed.). Houghton Mifflin. 3. Filimowicz, M. & Tzankova, V. (2020). Reimagining Communication: Experience. Routledge. 4. Anderson,W., Beach, J. & Civin, A. (2019). A Guide to Academic and Professional Communication (2nd ed.), Edge Learning Media.

1.	Name of Course :	MATHEMATICS FOR TECHNOLOGIST														
	Course Code :	AGGT1213														
2.	Synopsis :	In this course, students will learn matrix, geometry, calculus, and statistics. Topics in Calculus include differentiation and integration. Topics in Statistics include organizing and graphing data, descriptive statistics, probability and common probability distributions.														
3	Credit Value :	3														
4	Prerequisite/co-requisite: (if any)	NIL														
5	Course Learning Outcomes (CLO) :															
	CLO1	Solve algebraic matrix problems. (C3)														
	CLO2	Solve 2-D geometrical problems. (C3)														
	CLO3	Solve calculus problems including differentiation and integration. (C3)														
	CLO4	Solve statistical problems including organizing of data, graphical representation, descriptive statistics and probability distribution. (C3)														
	6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
			PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
		CLO 1	✓													
		CLO 2	✓													
		CLO 3	✓													
CLO 4	✓															
7	Course Content Outline															
	Matrix Algebra															
	• Matrix addition and multiplication.															
	• The null and the unit matrix.															
	• The matrix as an operator.															
	• Column vectors and row vectors															
	Geometry															
	• Two-dimensional rectangular Cartesian coordinate geometry, e.g. distances, angles, area of a triangle.															
	• The linear equations, perpendicular distance from a point to a line.															
	• Equation of a circle.															
Vectors																
• Unit vectors i and j .																
• Components of a vector.																
• Position vectors.																
• Addition and subtraction of vectors.																
Differentiation																
• Limits. Differentiation from first principles of simple algebraic functions.																
• Derivative by using rule of sums, products, quotients, functions of a functions.																
• Second order differentiation.																
- Maximum and minimum values.																
- First derivative test.																
- Second derivative test.																
Integration																
• Definite integrals.																
• Indefinite integral.																
•Integration by use of partial fractions.																
substitution, partial fractions, Integration by parts, reduction formulae																

	<p>Statistics</p> <ul style="list-style-type: none"> • Sampling, Data Presentation • Graphical representation of data: Histogram • Measures of Central Tendency: Mean, Median, Mode 		
	<p>Probability</p> <ul style="list-style-type: none"> • Sample Space, Event, Probability, Complement Event 		
8	<table border="1"> <tr> <td data-bbox="102 302 690 970"> <p>References (include required and further readings, and should be the most current)</p> </td><td data-bbox="690 302 1520 970"> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Glyn James (2020) Modern Engineering Mathematics, 6th Edition, Pearson. 2. Anthony Croft (2019) Mathematics for engineers, 5th Edition, Pearson. 3. Nur Farhana Sharip (2018) Engineering Mathematics 1, 1st Edition, Oxford Fajar. 4. Zuraini Ibrahim (2018) Engineering Mathematics 2, 1st Edition, Oxford Fajar. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. A. J. Washington (2018) Basic Technical Mathematics with Calculus, 11th edition, Pearson. 2. John Bird (2014) Engineering Mathematics, 7th edition, Routledge. 3. K.A. Stroud and Dexter J. Booth (2013) Engineering Mathematics, 7th edition, Palgrave Macmillan. </td></tr> </table>	<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Glyn James (2020) Modern Engineering Mathematics, 6th Edition, Pearson. 2. Anthony Croft (2019) Mathematics for engineers, 5th Edition, Pearson. 3. Nur Farhana Sharip (2018) Engineering Mathematics 1, 1st Edition, Oxford Fajar. 4. Zuraini Ibrahim (2018) Engineering Mathematics 2, 1st Edition, Oxford Fajar. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. A. J. Washington (2018) Basic Technical Mathematics with Calculus, 11th edition, Pearson. 2. John Bird (2014) Engineering Mathematics, 7th edition, Routledge. 3. K.A. Stroud and Dexter J. Booth (2013) Engineering Mathematics, 7th edition, Palgrave Macmillan.
<p>References (include required and further readings, and should be the most current)</p>	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Glyn James (2020) Modern Engineering Mathematics, 6th Edition, Pearson. 2. Anthony Croft (2019) Mathematics for engineers, 5th Edition, Pearson. 3. Nur Farhana Sharip (2018) Engineering Mathematics 1, 1st Edition, Oxford Fajar. 4. Zuraini Ibrahim (2018) Engineering Mathematics 2, 1st Edition, Oxford Fajar. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. A. J. Washington (2018) Basic Technical Mathematics with Calculus, 11th edition, Pearson. 2. John Bird (2014) Engineering Mathematics, 7th edition, Routledge. 3. K.A. Stroud and Dexter J. Booth (2013) Engineering Mathematics, 7th edition, Palgrave Macmillan. 		

1.	Name of Course :	INTEGRITY AND ANTI-CORRUPTION													
	Course Code :	MPU-2342													
2.	Synopsis :	This course covers the basic concept of corruption, including the value of integrity, anti-corruption, forms of corruption, abuse of power in daily activities and organisations, as well as ways to prevent corruption. Cases related to corruption are discussed. Teaching and learning methods are implemented in the form of ‘experiential learning’ through individual and group activities. At the end of this course, students will be able to understand the practise of integrity, the concept of corruption, anti-corruption, abuse of power, and the prevention of corruption in society and organizations.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Assume responsibility in upholding integrity and anti-corruption by producing a public service video. (A3, PLO8)													
	CLO2	Present the types of corruption and abuse of power in different settings. (A2, PLO10)													
	CLO3	Express the importance of integrity and anti-corruption in life. (A3, PLO8)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1								✓						
	CLO 2										✓				
	CLO 3								✓						
7	Course Content Outline														
Chapter 1: Overview of the Integrity and Anti-Corruption Course															
- Introduction to Integrity and Anti-Corruption Course															
- The Importance of Integrity and Anti-Corruption Course															
- Background and overall picture of the Integrity and Anti-Corruption Course															
Chapter 2: Integrity is the Core of Nation's Well-being															
- Corporate Governance															
- Human Governance															
- Ethics in Life															
- Definitions of integrity															
- Factors that compromise integrity															
- The fields of work which involve high integrity issues															
Chapter 3: Avoid Corruption, Pursue Dignity															
- Definition of corruption and anti-corruption															
- Why is corruption a serious crime?															
- Which group of people have high potential to be involved in corruption															
- Mindset of corrupted people															
- The fields of work with high risk of corruption															
- Malaysia’s ranking in Corruption Perception Index (CPI)															
Chapter 4: Agencies Related to the Prevention of Corruption and Cultivating Integrity															
- Malaysian Anti-Corruption Commission (MACC) as the Leading Anti-corruption Agency															
- Other agencies which serve to enhance integrity and governance															

	<p>Chapter 5: Corruption According to the MACC Act 2009</p> <ul style="list-style-type: none"> - Various forms of corruption and bribery - Corruption offences under MACC Act 2009 - How do gifts become bribes according to Malaysia's law <p><u>- Acts of Corruption and legal implication</u></p>
	<p>Chapter 6: Corporate Liability Offence</p> <ul style="list-style-type: none"> - Corruption offence by commercial organisation in Section 17A MACC Act 2009 - Definition of commercial organisation and parties involved - Punishment for corporate liability offence - Guideline to avoid corporate liability - TRUST principles under Section 17A MACC Act 2009
	<p>Chapter 7: White-collar Crimes</p> <ul style="list-style-type: none"> - Definition of white-collar crime - White-collar crime vs blue-collar crime - Effects of white-collar crimes - Examples of white-collar crimes - local and international <p><u>- Recent white-collar crimes</u></p>
	<p>Chapter 8: Causes, Symptoms and Effects of Corruptions</p> <ul style="list-style-type: none"> - Causes of corruption based on several theories - Symptoms of corruption <p><u>- Effects of corruption on individual, society and country</u></p>
	<p>Chapter 9: Fight Against Corruption; Reporting corruption, preventive measures and government initiatives</p> <ul style="list-style-type: none"> - Procedure to report corruption - Whistle-blower and witness protection - Corruption prevention measures and tips to avoid corruption - Government initiatives on corruption prevention
	<p>Chapter 10: Roles played by Social Institutions in Cultivating Integrity and Anti-Corruption</p> <ul style="list-style-type: none"> - Cultivating Integrity and Anti-Corruption - Roles of family institution - Roles of religious institution - Roles of educational institution
8	<p>References (include required and further readings, and should be the most current)</p> <ol style="list-style-type: none"> 1. Mohamad Tarmize Abdul Manaf (2021), Handbook on anti-corruption, Putrajaya. 2. Zukanain Abdul Rahman (2020), MACC The history : the battle for corruption-free malaysia, Univeristi Malaya Press. 3. The Center to Combat Corruption and Cronyism (2020), State of corruption power, politics and policies in Malaysia, Gerak Budaya Enterprise.

1.	Name of Course :	POLYMER TECHNOLOGY													
	Course Code :	AGMF1253													
2.	Synopsis :	This course covers classification, structures, properties, manufacturing processes and applications of polymeric materials.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Explain the relationship between molecular structure and property of polymeric materials. (C2, PLO1)													
	CLO2	Demonstrate an understanding on the basic concepts of various polymer manufacturing technology. (C3, PLO1)													
	CLO3	Manipulate machines to perform polymeric manufacturing process (P3, PLO2)													
	CLO4	Discover the application of polymeric materials in advanced technologies. (C3, PLO1)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2	✓													
	CLO 3		✓												
	CLO 4	✓													
7	Course Content Outline														
	Introduction to polymer: classification and sturcture of natural and synthetic polymers, thermoplastics and thermosetting polymers.														
	Properties of polymer: mechanical, thermal, electrical, and degradation.														
	Plastic Processing technology:additives, injection, extrusion, blow moulding, thermoforming, compression, 3d printing.														
	Introduction to rubber: classification and structure of natural and synthetic rubber.														
	Fundamental of rubber compounding and ingredients.														
	Rubber processing and vulcanization tecnologies include extrusion, compression moulding, autoclave, injetion moulding and dipping.														
	Application of polymeric materials in medical, pharmaceutical, energy, electronics technologies.														
8	References (include required and further readings, and should be the most current)	Main references supporting the course: 1. Callister, W.D., Rethwisch, D.G., Blicblau, A., Bruggeman, K., Cortie, M., Long, J., Hart, J., Marceau, R., Mitchell, R., Parvizi, R., Celis Leal, David Rubin de, Babaniaris, S., Das, S., Dorin, T., Mahato, A. & Orwa, J., (2021), Materials science and engineering: An introduction 2. Callister, W.D.,(2021) Fundamentals of materials science and engineering, 6th Edition, Wiley,Hoboken, NJ. 3. Kalpakjian, S. & Schmid, S.R., (2020) Manufacturing, Engineering and Technology, 8th Edition, Pearson													

1.	Name of Course :	CASTING TECHNOLOGY													
	Course Code :	AGMF1332													
2.	Synopsis :	This course provides students with a basic knowledge and understanding to the principles of foundry technology and solidification science. To gain theoretical and practical knowledge in material casting processes and develop an understanding of the variables which control materials casting in a production setting. The relationships between casting alloy structures, properties and other variables are also covered. Various techniques of producing casting, casting defects and their prevention methods are also covered. This course introduce students to good foundry practices and product design considerations.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Using appropriate casting techniques along with suitable gating and risering systems for quality casting. (C3, PLO3)													
	CLO2	Clarifying the various casting defects and their prevention methods. (C2, PLO1)													
	CLO3	Display an understanding of the proper procedures for producing molten metals. (P4, PLO2)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1			✓											
	CLO 2	✓													
	CLO 3		✓												
	7	Course Content Outline													
Introduction to Foundry - Steps involved in casting. Advantages, limitations and applications of casting process.															
Patterns and Pattern making. Pattern types, allowances for pattern, pattern materials, color coding and patterns storage.															
Moulding. Moulding methods and processes - materials, equipment, moulding sand ingredients, essential requirements, sand preparation and control, testing, cores and core making.															
Design considerations in casting, gating and Riser - directional solidification in castings, Metallurgical aspects of casting.															
Casting Processes. Sand castings, pressure die casting, permanent mould casting, centrifugal casting, precision investment casting, shell moulding, CO2 Moulding.															
Squeeze casting, electro slag casting, Fettling and finishing, defects in castings, casting of non-ferrous materials.															
Melting, Pouring and Testing. Melting furnaces - crucibles - oil fired furnaces, electric furnaces, cupola, selection of furnace, calculation of cupola charges.															
Degasification, inoculation, pouring techniques, casting defects and inspection of castings.															
Solidification. Nucleation and growth in castings. Homogeneous and heterogeneous nucleation in liquids.															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course:</p> <ol style="list-style-type: none"> 1. Kalpakjian, S. & Schmid, S.R., (2020) Manufacturing, Engineering and Technology, 8th Edition, Pearson. 2. P.N. Rao, (2019) Manufacturing technology: Foundry, forming and welding, 5th edition, New Delhi: McGraw-Hill Education. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. John Campbell, (2015) Complete Casting Handbook, Metal Casting Processes, Techniques and Design, Butterworth-Heinemann.
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1.	Name of Course :	FUNDAMENTAL OF GREEN MANUFACTURING													
	Course Code :	AGMF1343													
2.	Synopsis :	This course covers the fundamental concepts of sustainability through green manufacturing system which aims to conserve energy and natural resources. This is to ensure that they have minimal impact on the environment and society. It targets at fulfilling the needs of the present without compromising the ability of future generations to meet their own needs. An overview of the various methodologies and its application in improving the eco-efficiency is focused in this course.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Describe various type of renewable and alternative energy sources and their conversion and utilization. (C3)													
	CLO2	Explain how the importance of green manufacturing and the various process of green manufacturing. (C2)													
	CLO3	Perform experimental works with analytical judgement (P4)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2	✓													
	CLO 3		✓												
	7	Course Content Outline													
Introduction to energy science, work and power, energy units, terminologies, types of energy, energy security, and renewable energy sources. Efficiency of energy system															
Basics of Solar Radiation <ul style="list-style-type: none">• Solar energy potential for PV, irradiance, solar radiation and spectrum of sun, geometric and atmospheric effects on sunlight,• Photovoltaic effect, conversion of solar energy into electrical energy• Behavior of solar cells, its basic structure and electrical characteristics• Modelling of solar cell															
Hydropower, tidal and wave power <ul style="list-style-type: none">• Use of ocean thermal, wave, tidal and hydro renewable energy.• Introduction to analysis of hydro renewable energy collection and utilization for electric power production based on selection of hydro renewable energy technologies															
Bioenergy <ul style="list-style-type: none">• Biological solid fuel and biomass• Gaseous and Liquid Biofuels• Economic and environmental impact of biofuels															
Wind energy <ul style="list-style-type: none">• Introduction to wind generated energy and basic mechanism of converting wind energy to electrical energy.• Wind turbine systems based on power generation systems, connection to the electric grid, maintenance, and wind farms mechanism															
Green Manufacturing <ul style="list-style-type: none">• Introduction to green manufacturing with emphasis on its importance, benefits and areas of implementation															

	Motivation and Barriers	
	<ul style="list-style-type: none"> • Organization Motivation to green manufacturing 	
	Strategies for green manufacturing	
	<ul style="list-style-type: none"> • Green manufacturing metal for ferrous and non-ferrous metal 	
	Air and Air Quality Standard	
	<ul style="list-style-type: none"> • Atmosphere, weather and climate 	
8	Water Resources, Consumption Rates, and Quality Standards	
	<ul style="list-style-type: none"> • Water consumptions in agriculture, commercial, and industrial sectors • Global water quality issues 	
	Industrial Waste	
	<ul style="list-style-type: none"> • Hazardous waste 	
	Sustainability	
	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Saeed Moaveni, 2023, Energy, environment, and sustainability, 2nd Edition, Boston, MA, Cengage Learning 2. R. Ganesh Narayanan, Jay S. Gunasekera, 2023, Sustainable manufacturing processes, Amsterdam, Academic Press 3. Nader Anani, 2020, Renewable energy technologies and resources, Boston, London, Artech House 4. David A. Dornfeld, 2013, Green manufacturing : fundamentals and applications, New York, Springer <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Association for Manufacturing Excellence (AME), 2008, Green manufacturing : case studies in lean and sustainability, New York, Productivity Press

1.	Name of Course :	WELDING TECHNOLOGY													
	Course Code :	AGMP1233													
2.	Synopsis :	The syllabus includes topics that equip students with knowledge and skills to operate welding machineries including of welding process for SMAW, MIG, gas welding, TIG welding, plasma welding cutting, oxy Acetylene gas cutting and brazing.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Clarify the structure and components of various types of welding processes used by industries. (C2)													
	CLO2	Manipulate various types of welding machines that meet industry requirements. (P3)													
	CLO3	Practise the standard safety and health requirements. (A2))													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2		✓												
	CLO 3					✓									
7	Course Content Outline														
Industrial Safety: Mechanical accidents, electrical accidents related to welding processes, safety devices. Safety operating procedures Care and order in the workshop. Safety precautions. Industrial Safety and Healthy Act 1994.															
Welding processes: Introduction to arc welding, principles of oxy-acetylene welding. Oxy-acetylene welding equipment. Setting up oxy-acetylene equipment.															
Oxy-acetylene flames and welding techniques. Gas cutting.															
Arc welding machines. Polarity of welding machine arc in welding. Types of weld and preparation. Terminology in welding. Electrodes. Weld defects. Distortion. Symbols.															
MIG AND TIG Welding: Characteristics of arc. Shielding gas. Advantages and disadvantages.															
Brazing process. Weld testing and inspection.															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Larry Jeffus. (2020). Welding: Principles and Applications, 9th Edition, Cengage Learning. 2. Serope Kalpakjian, Steven R. Schmid. (2020). Manufacturing Engineering and Technology 8th Edition, Pearson. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Mikell P. Groover. (2020) Fundamentals of Modern Manufacturing : Materials, Processes, and Systems, 7th Edition, Hoboken, NJ : John Wiley. 2. Rao P. N. Manufacturing Technology. (2019) Volume 1, Foundry, Forming and Welding, 5th Edition, New Delhi : McGraw-Hil Education. 3. Michael A. Reeser. (2017). Welding Complete : Techniques, Project Plans & Instructions, Cool Springs Press.
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1.	Name of Course :	ELECTRIC CIRCUITS													
	Course Code :	AGMP1243													
2.	Synopsis :	This course provides students with a broad knowledge of electrical principles and laws. Students will be exposed to dc and ac circuits and will learn to use various electric circuit theorems to solve practical engineering problems. For practical, students are required to carry out experiments and to perform calculations and analysis of electrical circuits and theorem.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Solve simple dc and ac circuits with fundamental laws of electricity. (C3)													
	CLO2	Perform measurements, testing and troubleshooting of electrical circuits with guided response. (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2		✓												
7	Course Content Outline														
	Basic Electrical Systems														
	• Electromotive Force and potential difference														
	• Atomic structures														
	• Charge and Current														
	• Current flow convention														
	• Ideal and practical voltage and current source														
	Ohm's Law:														
	Energy and Power														
	• Energy and power														
• Power in an electric circuit															
DC Series Circuit															
• Resistors in series															
• Current in an electric circuit															
• Total series resistance,															
• Ohm's law in series circuit															
• Voltage sources in series															
DC Parallel Circuit															
• Resistors in parallel															
• Voltage in parallel circuits															
• Kirchhoff's current law															
• Total parallel resistance															
• Ohm's law in parallel circuits															
Circuit Theorems and Conversions															
• The voltage source															
• The current source															
• Source conversions															
• The superposition theorem															
Circuit Theorems and Conversions															
Thevenin's theorem															
Branch, Mesh and Node Analysis															
• Branch current method															
• Mesh current method															

	<p>Basic Instrumentation</p> <ul style="list-style-type: none"> • Principles and application of electronic voltage meters • Moving- coil instrument <p>Introduction to Alternating current and voltage</p> <ul style="list-style-type: none"> • Generation of alternating e.m.f. • Sinusoidal voltage sources • Voltage and current values of sine waves • Angular measurement of a sine wave • The sine wave formula • Average and effective values • Form factor <p>Electromagnetism and Inductors</p> <ul style="list-style-type: none"> • The magnetic field • Electromagnetism • Field strength • Permeability • Magnetic hysteresis • Electromagnetic induction • Induced e.m.f. <p>Capacitors</p> <ul style="list-style-type: none"> • The basic capacitor • Types of capacitors • Series capacitors <p>AC Circuits</p> <ul style="list-style-type: none"> • Response of basic R, L, C element to a sinusoidal voltage or current • Inductive and capacitive reactances, impedance, admittance, conductance, susceptance • Leading and lagging of current in R, L, C elements • Frequency response plots of the L and C elements <p>AC Circuits</p> <ul style="list-style-type: none"> • Single phase AC Circuits. Resistance and Inductance (Capacitance) in series. • Phasor representation of voltage and current in AC circuits. • Voltage and current in parallel RL and RC circuits. • Expressing voltage, current and impedance in complex notation, rectangular form and polar form. • Power in AC circuit.
8	<p>References (include required and further readings, and should be the most current)</p> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. T. Floyd, Principles of Electric Circuit, 10th edition. Pearson (2020). 2. John Bird, Bird's Electrical and Electronic Principles and Technology, 7th Edition. Routledge, (2022).

1.	Name of Course :	COMPUTER-AIDED DESIGN AND DRAFTING													
	Course Code :	AGMP1252													
2.	Synopsis :	This part provides students with background knowledge of AutoCAD commands and methods to construct engineering components as well as to expose students to the practical applications of these features.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Follow BS 8888:2017 to draw basic engineering components using CAD software. (P3)													
	CLO2	Reproduce complete working drawings by utilising given technical information. (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1		✓												
	CLO 2		✓												
7	Course Content Outline														
Setup (snap, grid, unit, limits) and coordinate system Organisation of the AutoCAD screen Types of coordinate entries. (absolute, relative and polar) Initial settings for units, limits															
Using draw toolbar Using draw/modify toolbar Creating and editing of points, lines, circles and arcs. Snap, grid and ortho modes. Object snap modes Dimensioning & insert text															
Block insert															
3D – wireframe modelling															
3D – solid modelling															
8	References (include required and further readings, and should be the most current)				Main References supporting the course 1. Benton, B.C. and Ommura, G, (2021), Mastering AutoCAD 2021 and AutoCADLT2021, Hoboken, N.J.: Autodesk,: Sybex. 2. Giesecke, F. E., Mitchell, A., Spencer, H. C., Hill, I. L., Dygdon, J. T. & Novak, J. E, (2016), Technical Drawing, 15th Edition, Prentice Hall. Additional references supporting the course 3. AutoCAD Reference Manual AutoDesk, Inc. 2012. 4. AutoCAD Tutorial AutoDesk, Inc. 2012.										

1.	Name of Course :	SOLID MODELLING AND 3D PRINTING													
	Course Code :	AGMP2113													
2.	Synopsis :	This course develops knowledge and skills through the use of Computer Aided Design software (Solidworks). Skills including 3D modelling on parts.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Construct part and assembly 3D models using Solidworks software. (P3)													
	CLO2	Produce part and assembly drawings using Solidworks software. (P4)													
	CLO3	Build a 3D solid model by using additive manufacturing technique. (P4)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1		✓												
	CLO 2		✓												
	CLO 3		✓												
	7	Course Content Outline													
Introduction to solid modelling															
Understanding and applying the product design intent for creating a solid model															
Engineering design concept															
Modelling the product desired outlook by using different modelling approach															
Basic Sketching															
Learning on 2D sketching, dimensioning, sketch relations															
Basic Part Modelling															
Learning on Terminology, details of the Part, filleting, editing Tools, Dimensioning															
Patterning															
Learning on reference geometry, linear pattern, circular pattern, mirror pattern															
Revolved Features															
Learning on case study: Handwheel															
Mass properties, revolved Features															
Orthographic drawing (Part I)															
Title block, angle of projection, view layout, supporting view															
Orthographic drawing (Part II)															
Dimensioning rule, Global dimensioning & tolerance (GD & T), assembly drawing															
Editing: Design Changes															
Learning on part editing, rebuilding tools															
Introduction to additive manufacturing															
Types of additive manufacturing															
Mini Project															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. SolidWorks Training Manual (Essential), SolidWorks Corporation, 2021 <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Howard, W.E. and Musto, J.C., 2012. Introduction to Solid Modeling Using SolidWorks 2012. New York, NY : McGraw-Hill. 2. Zhang, J., and Jung, Y.G., 2018. Additive Manufacturing: Materials, Processes, Quantifications and Applications. Oxford : Butterworth-Heinemann, Elsevier.
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1.	Name of Course :	METAL MANUFACTURING TECHNOLOGY													
	Course Code :	AGMF2173													
2.	Synopsis :	This course covers the fundamental concepts of various types of metal manufacturing processes that are being used by industries to produce or supply goods and services. It encompasses technological processing capacity, physical product limitations as well as property enhancing techniques.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Demonstrate an understanding on the basic concepts of various types of metal manufacturing processes. (C3, PLO1)													
	CLO2	Verify factors affecting various types of metal manufacturing processes. (C3, PLO3)													
	CLO3	Manipulate tools and machines to perform manufacturing process. (P3, PLO2)													
	CLO4	Demonstrate the ability to apply tools and techniques effectively in a team to construct a metal prototype (A3, PLO9)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2			✓											
	CLO 3		✓												
	CLO 4									✓					
7	Course Content Outline														
Introduction and overview of manufacturing															
• Manufacturing Processes															
Nature of metals and alloys															
• Structure-property-processing-performance relationships															
• Cold working, recrystallization and hot working															
Metal Forming and Sheet Metalworking (Fundamentals of metal forming)															
• Material behavior in metal forming															
• Temperature in metal forming															
• Friction and lubrication in metal forming															
Metal Forming and Sheet Metalworking (Bulk deformation processes In metalworking)															
• Rolling															
Metal forming and sheet metalworking (Sheet metalworking)															
• Cutting operations															
• Bending operations															
Particulate processing of metals (Powder metallurgy)															
• Conventional pressing and sintering															
• Materials and products for powder metallurgy															
Material removal processes (Machining operations and machine tools)															
• Machining and part geometry															
• Milling															
Material removal processes (Machining operations and machine tools)															
• Tool life															
Joining and assembly processes (Welding processes)															
• Arc Welding															
Joining and assembly processes (Mechanical assembly)															
• Threaded fasteners															
• Rivets and eyelets															

	<p>Property Enhancing and Surface Processing operations (Heat treatment of metals)</p> <ul style="list-style-type: none"> • Annealing <p>Property enhancing and surface processing operations (Surface processing operations)</p> <ul style="list-style-type: none"> • Surface hardening • Heat treatment methods and facilities <p>Non-traditional Machining Process</p> <p>Laser Beam Welding, wire EDM, Electrical Discharge Machining, Electrochemical grinding, Water-jet machining, Electron beam machining, Abrasive jet machining and the economics of non-traditional machining processes.</p>
8	<p>References (include required and further readings, and should be the most current)</p> <p>Main references supporting the course:</p> <ol style="list-style-type: none"> 1. Kalpakjian, S., Schmid, S.R., 2020, Manufacturing Engineering and Technology, 8th Edition, Pearson 2. Groover, M. P. (2020), Fundamentals of Modern Manufacturing: Materials, Processes and Systems, 7th Edition, John Wiley. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Groover, M. P., 2017, Principles of Modern Manufacturing, 6th Edition, Wiley New Jersey. 2. Levu O'Brein, 2017, Manufacturing Engineering and Technology. Larsen and Keller Education 3. Guillaume Lambotte, 2019, Materials Processing Fundamentals, Springer Nature Switzerland AG. 4. Kumar, Shailendra, Hussein, H. M. A. (Eds.). 2018. AI Applications in Sheet Metal Forming. Springer.

1.	Name of Course :	MECHANICAL TESTING													
	Course Code :	AGMF2192													
2.	Synopsis :	The course starts with the introduction of how various materials behave and why they differ in properties. It covers on the mechanical testing techniques of metallic and non-metallic materials. Some of the factors and variability, which affect the testing are also covered.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Elucidate the concepts of the commonly used mechanical testing methods. (C2, PLO1)													
	CLO2	Demonstrate an understanding of the various testing techniques. (C3, PLO3)													
	CLO3	Perform experimental works with analytical judgment. (P4, PLO2)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2			✓											
	CLO 3		✓												
	7	Course Content Outline													
Introduction Basic concepts, methods and machines in relation to mechanical testing. Mechanical behavior of materials. Conditions of mechanical stress. Applicable testing standards															
Interpretation and analysis of results Variability in the data collected from experiments or specimens. Influences of stress conditions, temperature, grain size, strain hardening, rate of straining, geometry and repeated load on macroscopic fracture.															
Hardness Indentation hardness testing: Brinell, Rockwell, Vickers and Knoop hardness testing. Micro- and nano-hardness testing. Hardness Correlations and Conversions															
Tensile Test Tension, compression and torsion testing. True stress–strain curves. Engineering stress–strain curves. Strength and ductility measurement. Effects of temperature and strain rate.															
Impact Test Impact testing with Charpy and Izod specimens and bending test. Ductile failure and brittle fracture. Impact energy calculation. Ductile to brittle transition behavior. Drop weight testing.															
Fatigue test S-N curves. Ultra high cycle fatigue. Fatigue strength, endurance strength, fatigue limit. Various factors affecting fatigue strength															
Creep test Creep rupture test, Temperature Dependence of Creep															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Dowling, Norman E. 2020. 5th Edition. Mechanical Behavior of Materials: Engineering Methods for Deformation, Fracture, and Fatigue. Pearson 2. G. H. Michler. 2019. Mechanical Properties of Polymers based on Nanostructure and Morphology. Taylor & Francis Ltd 3. Bhaduri, Amit. 2018. Mechanical Properties and Working of Metals and Alloys. Springer Singapore. Springer Nature Singapore Pte Ltd. 4. Komvopoulos, Kyriakos. 2017. 2nd Edition. Mechanical Testing of Engineering Materials. Cognella <p>Additional references supporting the course:</p> <ol style="list-style-type: none"> 1. T.H.G. Megson, 2019, 4th Edition, Structural and Stress Analysis, Butterworth-Heinemann. 2. Robinson. 2018. Failure Mechanisms in Polymer Matrix Composites: Criteria, Testing and Industrial Application. Elsevier Science and Technology.
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1.	Name of Course :	CNC PROGRAMMING AND CAM													
	Course Code :	AGMP2143													
2.	Synopsis :	This course emphasizes on practical skills that consists of two sections, where the first section covers part programming using G-codes and M-codes in CNC machining. The second section generate tool paths through CAD/CAM software. Programmes are simulated and run in actual CNC machines.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Find machining parameters and tools specifications to perform machining tasks. (C3)													
	CLO2	Construct part programs for CNC lathes and mills using G and M codes. (C3)													
	CLO3	Build part program using CAM software for machining processes. (P3)													
	CLO4	Manipulate a CNC machine to perform machining tasks as per design requirements. (P3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2			✓											
	CLO 3		✓												
	CLO 4		✓												
7	Course Content Outline														
Introduction to CNC Technology <ul style="list-style-type: none">History and development of CNC technology, Differences of NC, CNC and DNC.Characteristics of modern CNC machine CNC Operation <ul style="list-style-type: none">Axes and coordinate system for CNC machineNumerical Control mathematicsMachine zero point and work part zero pointTypes of tools and clamping for CNC milling and turning machine.Tool compensationTheories on milling and turning operations Programming <ul style="list-style-type: none">Procedure and format for NC programming.Application of various types of G codes and M codes and advanced machine codes for canned cycles.Milling and turning programming practice. CAD/CAM <ul style="list-style-type: none">Introduction to CAD/CAMCAD/CAM software system introductionSoftware drafting and modeling tools.Materials, tool, and program information parameters.2 Axis machining – 2D Contour machining, pocketing, Island machining, drilling, tapping.3D surface machining and tool path generation. CNC Machining <ul style="list-style-type: none">Set Up a Computer Numerical Control (CNC) MillPerform Part Modifications on CNC Mill															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course:</p> <ol style="list-style-type: none"> 1. Negi, P. K., Ram, M., & Yadav, O. P. (2019). Basics of CNC programming. Gistrup, Denmark: River Publishers. 2. Rao, P. N, (2019), Manufacturing technology. Volume 2, Metal cutting and machine tools, 4th edition McGraw-Hill Education <p>Additional references supporting the course:</p> <ol style="list-style-type: none"> 1. Ken Evans, (2016) Programming of CNC machines, South Norwalk, CT: Industrial Press. 2. Kelly Curran, (2016) CNC machining & turning center programming and operation: including quality in manufacturing. CreateSpace Independent Publishing Platform
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1.	Name of Course :	PROJECT MANAGEMENT AND FINANCE													
	Course Code :	AGMP2153													
2.	Synopsis :	The syllabus provides contents on today’s cost-competitive and often complex work environment. This course provides students with skills and knowledge in organizing multi-disciplinary teams to achieve successful project outcomes; enables students to understand the key components of a successful project and to embed the necessary processes, components, and attributes into execution of their projects along with managing the costing and finance.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Demonstrate a comprehensive understanding of project management principles and the concept of finance costs. (C3, PLO1)													
	CLO2	Perform appropriate project management tools and techniques in project implementation. (P4, PLO2)													
	CLO3	Explain the significance of ethical responsibility and interpersonal skills in project management and finance. (A3, PLO7)													
	CLO4	Propose relevant management skills and appropriate financial techniques for project evaluation. (A3, PLO7)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2		✓												
	CLO 3							✓							
	CLO 4							✓							
7	Course Content Outline														
Introduction to project management Definition and nature of projects, need for project management, project life-cycle. Basic concepts of initiating, planning, executing, monitoring and closing.															
Role of project manager, project organisation, composition of project team.															
Project Initiation and Project Planning Initial project coordination, systems integration, work breakdown structure															
Networking and Scheduling Networking techniques, PERT and CPM, Gantt charts, Use of project management software.															
Project Monitoring and Control Planning-monitoring-controlling cycle, designing the monitoring system, monitoring methods, data collection.															
Fundamental purposes of control, types of control processes, balance in a control system.															
Project closure Varieties of project termination, when to terminate project, the termination process, project final report.															
Project budgeting and control Budgeting methods, cost estimation and Earn Value Analysis															
Cost Concepts Time value of money															
Development of Project Cash Flow															
Engineering Economic Techniques (Financial Techniques)															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. A Guide to the Project Management Body of Knowledge (PMBOK® Guide) — Seventh Edition, (2021), Project Management Institute. 2. Jack R. Meredith, Scott M. Shafer (2022), Project Management - A Managerial Approach, 11th Edition, Wiley. 3. Harold Kerzner, (2022), Project Management: A Systems Approach to Planning, Scheduling, and Controlling 13th Edition, Wiley 4. John A. White, Kellie S. Grasman, et al, (2020), Fundamentals of Engineering Economic Analysis, 2nd edition, Wiley <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. A Guide to the Project Management Body of Knowledge (PMBOK® Guide) — Sixth Edition, 2018, Project Management Institute. 2. Erik W Larson. (2018), Project Management – the managerial process, 7th Edition, McGraw Hill. 3. Blank, L. T. & Tarquin, A. (2018), Engineering Economy, 8th Edition, McGraw Hill, New York, United States. 4. Don Newnan, Ted Eschenbach, et al, (2019), Engineering Economic Analysis, 14th Edition, Oxford University Press.
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1.	Name of Course :	INDUSTRIAL AUTOMATION													
	Course Code :	AGMP2163													
2.	Synopsis :	This course emphasizes students with the knowledge and practical use of sensors, pneumatic, electro-pneumatic, and hydraulic and integration of these systems with programmable logic control.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Describe the working principles and applications of sensors, actuators, programmable controllers and computer integration system technologies. (C2)													
	CLO2	Manipulate sensors, actuators, pneumatic & hydraulic powered machinery in automation system. (P3)													
	CLO3	Design an industrial automation system with the integration of programmable controller, sensors and actuators. (C4)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2		✓												
	CLO 3			✓											
	7	Course Content Outline													
Introduction to industrial automation Basic definition and reasons for automation. Basic components of an Automatic control system. Open loop and closed loop system. Explain The two main categories of automatic control. Explain analogue, Digital and binary signals. Discuss the different levels of automation.															
Pneumatic Power Pneumatic components, symbols and circuits The use of ISO 1219 for pneumatic symbols. Construction and use of Single acting and double acting cylinders as pneumatic output devices. Use of pneumatic valves as signal input and signal processing elements. Classification and construction of valves. Operation of different types of Pneumatic counters. Some basic pneumatic circuits. Pneumatic circuits for multi-cylinder control by the cascade method.															
Electro-pneumatic System Implementation of a control chain by electro-mechanical and electro-Pneumatic components. Some basic electro-pneumatic control circuits for multi-cylinder control.															
Programmable Logic Control (PLC) Introduction to functions and components of a PLC PLC programming One input and one output, AND, OR, NOT, NOR, NAND, Exclusive OR(XOR) functions, latching, timer, off delay timer, on delay timer, LED blinking function, counter, advanced programming commands. PLC software programming. PLC wiring – connect PLC to 24 V power supply – Connect input device to PLC (e.g. limit switch) Connect output device to PLC (e.g. relay)															

	<p>Hydraulic Fluid Power</p> <p>Basic principles and application of power hydraulics. Properties and function of hydraulic fluid. Hydraulic pumps. Hydraulic actuators. Directional, speed and pressure</p>
	<p>Computer Integrated Manufacturing System</p> <p>CIM software concept, Entrepreneur Information system(EIS), Manufacturing Execution system (MES), SCADA and HMI technology</p>
8	<p>References (include required and further readings, and should be the most current)</p> <p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. W. Bolton, (2019), Mechatronics: Electronics Control Systems in Mechanical and Electrical Engineering, 7th Edition, Prentice-Hall. 2. Mehta, B. R., & Reddy Y.j. (2015) Industrial Process Automation Systems Design and Implementation, Elsevier, Oxford. 3. Alan S. Morris, Reza Langari. (2021) Measurement and instrumentation: theory and application, 3rd Ed., Academic Press, Elsevier, Oxford <p>Additional references</p> <ol style="list-style-type: none"> 1. Groover, M.P., (2016), Automation, Production System and Computer – Integrated Manufacturing, 4th Edition, Global Edition, Pearson. 2. Jack, H., (2010), Automating Manufacturing Systems with PLCs: Ver 7.0.

1.	Name of Course :	CIVIC CONSCIOUSNESS AND VOLUNTEERISM													
	Course Code :	MPU-2282													
2.	Synopsis :	This course discusses on how a person can discover his own potential as a member of the society in which he/she lives so that he/she can contribute positively towards its development. During the study, students have to carry out varieties of projects in order to create awareness among the society. Among the projects are, fund raising activities, educational visit to orphanage, old folk homes and refugee centres and collaborating with various local NGO's on certain issues.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Organise a volunteer or charity activity for the benefit of the society. (P4)													
	CLO2	Carry out a reflective dialogue on issues that are in need of civic awareness and responsibilities. (A4)													
	CLO3	Write a reflective report concerning a volunteer or charity activity. (A4)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1											✓			
	CLO 2								✓						
	CLO 3								✓						
	7	Course Content Outline													
An Overview and Civic Conception - • Malaysian Civic Awareness • Self-Building – Mind, Body and Soul • The National Identity • The Government • Definition of Civic and Civic Awareness															
Developing Consciousness toward My Own Potential - strengths and weaknesses • The importance of developing own potential • Values for the development of own potential • Nature vs Nurtured • Malaysia's Education • Beginning from the man in the mirror: Evaluating own															
Building and expanding My Potential - Civic Consciousness - • Family • Friends															
Civic Consciousness in the Malaysian Context – Socio-cultural Awareness and Awareness of the Legal System - • Issues of Race, Class and Gender • The Uniqueness of Malaysian Culture and Traditions • Citizen: Responsibility and Tolerance • Conditional Freedom of Rights Speech Religion Assembly															
Civic Consciousness in the Malaysian Context - Civic Awareness and the Economy - • Road Usage • Wastage • Buying Malaysian Goods • The Use of Public Amenities															

	<p>Civic consciousness in the Malaysia and Global Context -</p> <ul style="list-style-type: none"> • The Cyber World 	<ul style="list-style-type: none"> • Environment
	<p>Translating Civic Consciousness into Civic Responsibility -</p> <ul style="list-style-type: none"> • The Need of Concrete and Pragmatic Actions • Volunteerism 	
	<p>Reflection on Civic Consciousness -</p> <ul style="list-style-type: none"> • Extraordinary Deeds by Ordinary Malaysians • Philanthropists of Malaysia 	
8	<p>References (include required and further readings, and should be the most current)</p>	<p>1.Chew Wei Wei et.al 2019, Civic Consciousness and Volunteerism, Cengage Asia Ltd. Ptd.</p> <p>2. Richard M 2016, Altruism: the power of compassion to change yourself and the world, Little, Brown and Co., New York.</p>

1.	Name of Course :	ETHICS AND PROFESSIONALISM													
	Course Code :	AGMP2312													
2.	Synopsis :	This course covers ethics and professionalism, technologists and society and issues on sustainability development.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Discuss the roles and responsibilities, and principles of ethics of a technician in relation to society and norms of technology practice. (A2)													
	CLO2	Discuss societal, safety, health, legal, cultural and environmental impact by the technological developments in society. (A2)													
	CLO3	Discuss issue on use of natural resources in technology practice. (A2)													
	CLO4	Discuss issues on pollutions in technology practice. (A2)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1					✓									
	CLO 2								✓						
	CLO 3								✓						
	CLO 4								✓						
7	Course Content Outline														
	Qualified Technician’s ethical considerations The need for a code of ethics, general provisions of such code, codification of ethical considerations in practice and in law, applicability of code of ethics in technology practice.														
	Route to Qualified Technician and Certified Technician registration. Background, elements of approved scheme of academic learning, elements of industrial practice, legal requirements.														
	Technology and Society Definition of technology and the role of technology in providing capabilities to society, the response and change of society to new capabilities, the development of new technologies to achieve desired functionality, socio-technological systems, evaluation of new technology.														
	Utilisation of natural resources Considerations in the use of key natural resources – population, consumption patterns, state of technology and social factors.														
	Energy issues Need for energy, problems in the use of energy, approaches to resolving problem of depletion and of environmental effect, nuclear energy and hydrogen economy. United Nations Sustainable Development Goals (UNSDG) in energy usage and efficiency.														
	Major environmental impact Acid rain, global warming and the impact on society, approaches in resolving impact. United Nations Sustainable Development Goals (UNSDG) in greenhosue issue..														
	Pollution and waste disposal Types, causes and the solution to problems of pollution and waste disposal.United Nations Sustainable Development Goals (UNSDG) in waste management and reduction														

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Moaveni, S. (2023) Energy, Environment and Sustainability, 1st ed, Cengage 2. Masten S.J. and Davis M.L., (2020), Principles of Environmental Engineering and Science, 4th ed., McGrawHill 3. Johnson, G. (2020).Engineering ethics : contemporary and enduring debates, New Haven ; London : Yale University Press <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Nicholas Sakellariou, Rania Milleron (2018) Ethics, Politics, and Whistleblowing in Engineering, CRC Press. 2. Gloobal Profession (2018) Professional Engineering: Human Values and Engineering Ethics
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1.	Name of Course :	PENGHAYATAN ETIKA DAN PERADABAN													
	Course Code :	MPU-2173													
2.	Synopsis :	Kursus ini menjelaskan tentang konsep etika daripada perspektif peradaban yang berbeza bagi mengenal pasti sistem, tahap perkembangan, kemajuan dan kebudayaan merentas bangsa dalam mengukuhkan kesepaduan sosial menurut acuan Malaysia. Selain itu, perbincangan juga berkaitan isu-isu kontemporari dalam aspek ekonomi, politik, sosial, budaya dan alam sekitar daripada perspektif etika dan peradaban yang dapat melahirkan pelajar yang bermoral dan profesional.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Membentangkan Konsep Etika dan Peradaban dalam Kehidupan Sehari-hari. (A2)													
	CLO2	Menjustifikasikan Isu Etika Dan Peradaban Dalam Acuan Malaysia Berdasarkan Senario Semasa. (A3)													
	CLO3	Menjelaskan Peranan Etika dan Peradaban dalam Kajian Kes Tempatan dan Antarabangsa. (A3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1									✓					
	CLO 2									✓					
	CLO 3											✓			
7	Course Content Outline														
Bab 1 Pengenalan Penghayatan Etika dan Peradaban dalam Acuan Malaysia															
• Definisi Etika & Adab															
• Susur masa Etika & Peradaban															
• Zaman PascaKolonial & Era Moden															
• Percampuran Versi Etika Melalui Teknologi															
• Etika dalam Persekitaran Formal & Tidak Formal															
• Etika & Peradaban – Acuan Sosiologi, Sejarah, Struktur Sosial & Biografi															
• Penghayatan Etika dan Peradaban – Masyarakat, Negara & Pasaran															
Bab 2 Konsep Etika & Peradaban															
• Konsep Etika															
• Perspektif Agama & Kepercayaan – Hindu, Buddha, Islam, Kolonial & PascaKolonial															
• Konsep Peradaban – Kolonial & PascaKolonial, Timur Barat, Perspektif Agama & Kepercayaan															
Bab 3 Etika & Peradaban dalam Masyarakat Kepelbagaian															
• Petempatan Masyarakat															
• Garis Masa Pembentukan Masyarakat Malaysia															
• Proses Pembentukan Kelompok Masyarakat															
• <u>Pembinaan Negara Bangsa – Integrasi</u>															
Bab 4 Pemantapan Kesepaduan Nasional Malaysia															
• Perpaduan: Matlamat Diidamkan															
• <u>Kesepaduan: Tahap Dicapai</u>															
Bab 5 Pembinaan Peradaban Majmuk Di Malaysia															
• Perkembangan Sejarah Peradaban Di Alam Melayu															
• Sejarah Sosial di Malaysia															
• <u>Konsep Negara & Bangsa</u>															

	<p>Bab 6 Perlembagaan Persekutuan – Tapak Integrasi, Wahana Etika & Peradaban</p> <ul style="list-style-type: none"> • Definisi & Konsep Tapak Integrasi • Definisi & Konsep Perlembagaan • Sejarah & Latar Belakang Perlembagaan 	
	<p>Bab 7 Teknologi Maklumat & Komunikasi Penggerak Kesepaduan Nasional Di Malaysia</p> <ul style="list-style-type: none"> • Evolusi & Pengglobalan Teknologi • Evolusi Teknologi & ICT Di Malaysia • Konsep Hubungan Manusia & Teknologi • Etika & Peradaban Dalam Penggunaan ICT • ICT Tapak Pengukuhan Kesepaduan Nasional • Isu Semasa ICT 	
	<p>Bab 8 Peranan Etika & Peradaban Mendokong Tanggungjawab Sosial Di Malaysia</p> <ul style="list-style-type: none"> • Konsep Takrifan Harian & Autoriti • Fungsi Etika & Peradaban Dalam Membentuk Tanggungjawab Sosial • Kesedaran Nasional Dalam Tanggungjawab Sosial • Tanggungjawab Sosial Dalam & Luar Negara 	
	<p>Bab 9 Cabaran Kelestarian Etika & Peradaban Di Malaysia</p> <ul style="list-style-type: none"> • Kelestarian Etika & Peradaban Malaysia • Kedinamikan Etika & Peradaban Malaysia • Hakisan Sosial Ke Atas Kelestarian Etika & Peradaban • Kelansungan Kelestarian Etika & Peradaban – Pembangunan Negara Bangsa & Ketamadunan Malaysia 	
8	References (include required and further readings, and should be the most current)	<p>1. Ateerah Abdul Razak, Nur Azuki Yusuff, Zaleha Embong, 2021, Penghayatan Etika dan Peradaban, UMK, Bachok, Kelantan.</p> <p>2. Ahmad Zamil Abdul Khalid (et al), 2021, Penghayatan Etika dan Peradaban, UUM Press, Sintok, Kedah.</p>

1.	Name of Course :	HEAT TREATMENT													
	Course Code :	AGMF2382													
2.	Synopsis :	This course covers the fundamental concepts of the various types of heat treatment processes that are widely used in the industry. It covers a variety of solid-state transformation processes under equilibrium or non-equilibrium conditions													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Relate the various types of heat treatments and how they affect the microstructure of metal or alloy for industrial applications (C2, PLO1)													
	CLO2	Display the changes in the microstructure and mechanical properties of equilibrium and non-equilibrium cooling (P3, PLO2)													
	CLO3	Differentiate the factors that affect the selection of engineering materials and different types of heat treatment processes used in the industry (C4, PLO3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2		✓												
	CLO 3			✓											
7	Course Content Outline														
Iron-Carbon phase diagram. More detailed studies on heat treatment of ferrous alloys															
Isothermal decomposition of Austenite. TTT and CCT diagrams															
Normalizing, annealing, hardening, tempering etc. Effect of heat treatment on microstructures such as pearlite, bainite and martensite. Quenching medium and its associated cooling rates.															
Mass effect, Hardenability of Steels. The effects of alloying elements and austenite grain size on hardenability. The Jominy end-quench test.															
Eutectoid Transformation. Bainite Transformation. Martensitic transformation.															
Special heat treatment processes, such as martempering and austempering. Strengthening Mechanism															
Precipitation hardening in Al-Cu, alloy system. Formation of metastable transition phases. Age hardening															
Surface hardening treatments: carburising, nitriding, Carbonitriding, flame and induction hardening.															
Residual stress and distortion in heat treatment; causes, prevention and relief. Types of heat treatment furnaces.															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1 . Sunan Metharom. 2016. Heat Treatment: Conventional and Novel Applications. Scitus Academics LLC. 2. Richard Lofting. 2018. Heat Treatment. Crowood Press. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Daniel H. Herring. 2014. Atmosphere Heat Treatment: Principles, Applications, Equipment, Volume 1. BNP Media. ISBN: 978-0-692-28393-6 2. Daniel H. Herring. 2015. Atmosphere Heat Treatment: Atmospheres, Quenching, Testing, Volume 2. BNP Media. ISBN: 978-0-692-51299-9
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1.	Name of Course :	COMPOSITE AND CERAMICS TECHNOLOGY													
	Course Code :	AGMF2393													
2.	Synopsis :	This course covers the knowledge and understanding of the properties, applications and fabrication of various advanced composites and ceramic materials.													
3	Credit Value :	3													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Demonstrate an understanding on the basic concepts of various types of composites and ceramics. (C3, PLO1)													
	CLO2	Select appropriate fabrication techniques for composites and ceramics and their intended applications. (P1, PLO2)													
	CLO3	Identify factors affecting various types of composites and ceramics manufacturing processes. (C4, PLO3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2		✓												
	CLO 3			✓											
7	Course Content Outline														
	Introduction and overview of manufacturing: Manufacturing Processes; Production Systems.														
	Introduction to ceramic materials: Structure of ceramics														
	Introduction to ceramic materials: Properties of ceramics														
	Ceramics processing technology: Preparation of powders; Mixing process														
	Ceramics processing technology: Compaction; shaping process														
	Ceramics processing technology: firing and sintering; finishing ; Defects and quality control.														
	Introduction to Glass: Structure and Properties														
	Glasses processing technology														
	Introduction to Composite Materials: I) Definition, classification and application of composite materials; II) The benefit of composites; III) Constituents of composite materials.														
	Factors affecting Properties of Composites: I) Function of matrix, reinforcement & interphase; II) Types of fibres; III) Failure mechanism of fibre reinforced composites.														
	Polymer matrix composites (PMC): I) Introduction to PMCs; II) Types of polymer matrices; III) Processing of PMCs; IV) Examples of PMCs.														
	Metal matrix composites (MMC): I) Introduction to MMCs; II) Types of metal matrices; III) Processing of MMCs; IV) Examples of MMCs														
	Ceramic matrix composites (MMC): I) Introduction to CMCs, II) Types of ceramic matrices, III) Processing of CMCs, IV) Examples of CMCs.														
Impacts of industrial revolution 4.0															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Callister, William D. Jr., 2015, Materials Science & Engineering, 9th Edition, Chapman & Hall. 2. Mohamed N. Rahaman. 2017, 2nd Edition, Ceramic processing, CRC Press. <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Ever J. Barbero, 2018, Introduction to Composite Materials Design, (Composite Materials: Design and Analysis), 3rd Edition, CRC Press. 2. Mikell P. Groover, 2017, SI Edition, Groover's principles of modern manufacturing : materials, processes, and systems, Wiley.
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1.	Name of Course :	NDT & MATERIALS CHARACTERISATION													
	Course Code :	AGMF2302													
2.	Synopsis :	The course starts with the introduction of how various materials behave and why they differ in properties. This course covers five major non-destructive testing techniques of metallic materials. Some of the factors and variability, which affect the testing are also covered.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Use non-destructive testing techniques to understand the defects and the characteristic of industrial components. (C3, PLO1)													
	CLO2	Analyse results obtained from various testing techniques. (C4, PLO3)													
	CLO3	Select appropriate testing techniques for material characterization. (C4, PLO3)													
	CLO4	Perform experimental works with analytical judgment. (P4, PLO2)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2			✓											
	CLO 3			✓											
	CLO 4		✓												
7	Course Content Outline														
Liquid Penetrant Testing – Principles, types and properties of liquid penetrants and developers, applications, advantages and limitations, testing procedures, interpretation of results. Magnetic Particle Testing- Principles, inspection materials, magnetization and demagnetization methods, applications, advantages and limitations, interpretation of test indications.															
Ultrasonic Testing-Principle, transducers, transmission and pulse-echo method, straight beam and angle beam, instrumentation, A-Scan, B-scan, C-scan. Phased Array Ultrasound, Time of Flight Diffraction, applications, advantages and limitations, data representation.															
Eddy Current Testing-Principle, generation of eddy currents,properties of eddy currents, applications, advantages, limitations, interpretation/evaluation. Radiography - Principle, interaction of X-Ray with matter, applications, advantages, limitations, interpretation/evaluation.															
Optical Microscopy (Light microscope): Principles, operation procedures, control parameters affecting good images, applications, advatanges and limitations.															
Electron Microscopy (SEM, TEM, EDX): Principles, differences, operation procedures, control parameters affecting good images, applications, advantages and limitations.															
Fourier-transform infrared spectroscopy (FTIR) and Ultraviolet–visible spectroscopy (UV-Vis) - Principles, preparation and operation procedures, applications, advantages and limitations, interpretation of results.															

	Thermal Analysis Techniques - Basic thermal analysis : concepts, basic theory and methods in relation to thermogravimetric Analysis(TGA), Differential Scanning Calorimetry(DSC), Differential Thermal Analysis (DTA)	
8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. Don E. Bray, 2018, Nondestructive Evaluation : A Tool in Design, Manufacturing and Service, CRC Press. 2. Bowler, 2019, Eddy-Current Nondestructive Evaluation, Springer-Verlag. 3. Rodenburg, John, 2018, A record-breaking microscope, Nature. <p>Supporting references supporting the course</p> <ol style="list-style-type: none"> 1. Ida, Nathan, Meyendorf, Norbert (Eds.), 2019, Handbook of Advanced Nondestructive Evaluation, Springer International . 2. Evgeny N., 2018, Non-destructive Testing and Repair of Pipelines, Springer International. 3. Khursheed, Anjam, 2011, Scanning electron microscope optics and spectrometers, World Scientific.

1.	Name of Course :	QUALITY AND SAFETY													
	Course Code :	AGMP2242													
2.	Synopsis :	This course includes topics that cover ISO 9000 quality management system, quality concepts, quality assurance, quality control, inspection and record. Students learn quality techniques including control charts, sampling and acceptance, seven QC tools, cost of quality and process capability study. In the aspect of safety in manufacturing environment, legal requirements for industrial safety, hazard identification and risk assessment. Safety condition in use of chemical, mechanical and electrical machineries and the personal protection equipment are structured in the contents.													
3	Credit Value :	2													
4	Prerequisite/co-requisite: (if any)	NIL													
5	Course Learning Outcomes (CLO) :														
	CLO1	Describe the importance of quality and safety in manufacturing environment. (A1)													
	CLO2	Apply concept with skills and techniques of quality tools in manufacturing environment. (C3)													
	CLO3	Demonstrate knowledge and attitude in complying to safety standards in industrial environment. (A3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1					✓									
	CLO 2	✓													
	CLO 3								✓						
7	Course Content Outline														
	Introduction to ISO 9000 Quality Management System(QMS)														
	Introduction to Concepts of quality assurance and quality control, inspection and records														
	Control chart														
	Seven QC tools:														
	• Cause-and-effect diagram (also called Ishikawa or fishbone chart): Identifies many possible causes for an effect or problem and sorts ideas into useful categories.														
	• Check sheet: A structured, prepared form for collecting and analysing data; a generic tool that can be adapted for a wide variety of purposes.														
	• Control charts: Graphs used to study how a process changes over time.														
	• Histogram: The most commonly used graph for showing frequency distributions, or how often each different value in a set of data occurs.														
	• Pareto chart: Shows on a bar graph which factors are more significant.														
• Scatter diagram: Graphs pairs of numerical data, one variable on each axis, to look for a relationship.															
• Stratification: technique that separates data gathered from a variety of sources so that patterns can be seen (some lists replace “stratification” with “flowchart” or “run chart”).															
Acceptance Sampling															
Introduction to Safety and OSHA															
General Safety in workshop, Safety symbols and Personal Protection Equipment															

	Safety in use of Chemicals and confine space
	Safety in Use Electrical machines and Fire safety
	Safety in Use of Mechanical machines and welding
	Definition and determination of industrial/engineering safety, hazard identification and risk assessment.
	Safety audit
	Legal considerations in industrial safety, safety and health legislation, case studies of major industrial accidents and lessons learnt. Factors effecting health in industry
8	<p>References (include required and further readings, and should be the most current)</p> <p>Main references supporting the course:</p> <ol style="list-style-type: none"> 1. Douglas C. Montgomery. (2020). Introduction to statistical quality control, 8th edition, Wiley. 2. M. Rashad Islam. (2022) Construction safety : health, practices, and OSHA, 1st edition, McGraw Hill. 3. (2019) Guidelines for Integrating Process Safety into Engineering Projects. New York : John Wiley & Sons. <p>Additional references supporting the course:</p> <ol style="list-style-type: none"> 1. Amitava Mitra (2018). Fundamentals of quality control and improvement, Wiley. 2. Sam Mannan (2014). Lees' process safety essentials : hazard identification, assessment and control, 1st edition, Oxford, UK : Butterworth-Heinemann. 3. Sengupta, Sukalyan (2018). Hazardous Waste Management : Introduction and Background. New York : Momentum Press.

1.	Name of Course :	FINAL YEAR PROJECT													
	Course Code :	AGMF2256													
2.	Synopsis :	This course will introduce students to the identification of well-defined applied engineering problems and design systems, project implementation and management with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. Practical skills will be consolidated with fabrication techniques as well as practical troubleshooting techniques employing common laboratory equipment and manufacturing technology. Students are expected to present their results orally and document their solutions. A working prototype or simulation, as appropriate, of their solution is required to complete the course.													
3	Credit Value :	6													
4	Prerequisite/co-requisite: (if any)	AGMP2153 PROJECT MANAGEMENT AND FINANCE													
5	Course Learning Outcomes (CLO) :														
	CLO1	Studies a well defined problem through literature review. (A3)													
	CLO2	Analyse a well-defined problem through appropriate codified methods. (C4)													
	CLO3	Solving a well-defined problem by incorporating considerations on public health and safety, society, environment and sustainability. (P6)													
	CLO4	Discuss the impact of technical solutions in societal and environmental contexts towards sustainable development. (A2)													
	CLO5	Demonstrates ethical principles and professional norms in solving a technical problem. (A3)													
	CLO6	Demonstrates proper project management skills and techniques with consideration on resource management. (A3)													
	CLO7	Present project deliverables effectively through oral and written modes. (A2)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1						✓								
	CLO 2			✓											
	CLO 3		✓												
	CLO 4					✓									
	CLO 5								✓						
	CLO 6							✓							
	CLO 7				✓										
7	Course Content Outline														
Lectures on the following topics: - General briefing of project titles - Proposal writing - Literature search - Research technique Background study, project proposal and project design Project design and implementation															

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course</p> <ol style="list-style-type: none"> 1. C R Kothari, (2019) Research methodology : methods and techniques, Bangalore : New Age International. 2. Chris Hart. (2018) Doing a literature review : releasing the research imagination. London : Sage <p>Additional references supporting the course</p> <ol style="list-style-type: none"> 1. Mamun Habib, Hafsa Maryam (2014), Research Methodology-contemporary practices: guidelines for academic researchers, Cambridge Scholars Publishing. 2. Ranjit Kumar (2011), Research Methodology: a step-by-step guide for beginners, 3rd Edition, Sage Publications 3. Fink, A. (2009), Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications.
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1.	Name of Course :	INDUSTRIAL TRAINING													
	Course Code :	AGMF3118													
2.	Synopsis :	<p>This course involves minimum 16 weeks attachment in the industry which will expose students to the actual working environment where students will be treated as part of the workforce and bound to the rules and regulations of the organization.</p> <p>In general, the aim of industrial training is to give exposure, experience and professional skills to various aspects of engineering disciplines in related industries. The students are also expected to be familiarized with efficient, accountable and ethical conduct as they will be supervised directly under the company's personnel.</p>													
3	Credit Value :	8													
4	Prerequisite/co-requisite: (if any)	Nil													
5	Course Learning Outcomes (CLO) :														
	CLO1	Apply relevant technology knowledge in accordance to industry practice. (C3)													
	CLO2	Demonstrate an understanding of the role of technologist in society when executing industrial activities within resources given under supervision. (A3)													
	CLO3	Demonstrate good attitude and ethics in accordance with professional technology practice. (A3)													
	CLO4	Demonstrate competency in communication skills at workplace. (A3)													
	CLO5	Demonstrate the ability to work effectively in a workgroup. (A3)													
	CLO6	Demonstrate awareness of the latest changes in technological world. (A3)													
6	Course Learning Outcomes (CLO)	Programme Learning Outcomes (PLO)													
		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
	CLO 1	✓													
	CLO 2					✓									
	CLO 3								✓						
	CLO 4				✓										
	CLO 5									✓					
	CLO 6						✓								
7	Course Content Outline														
	Pre-application briefing on guidelines and procedure for internship application.														
	Pre-training briefing on guidelines and procedure during training and after training														
	Students will participate in daily engineering activities and processes of the organisation such as production, design, maintenance, service, installation, collecting and analysis of data, coordinating group activities, attending meetings and discussions, etc.														

8	References (include required and further readings, and should be the most current)	<p>Main references supporting the course:</p> <ol style="list-style-type: none"> 1. Kevin Kelloway, Lori Francis, Bernadette Gatien (2020), Management of Occupational Health and Safety, 8th edition, Nelson Education Limited. 2. Charles E Harris, Jr., (2019) Engineering Ethics: Concepts and cases, 6th Edition, Boston, Cengage Learning <p>Additional references supporting the course:</p> <ol style="list-style-type: none"> 1. Charles B. Fleddermann, (2012) Engineering Ethics, 4th Edition, Pearson/Prentice Hall
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