# 令和7年度　学習支援計画書

| 授業科目区分 | 科　目　名 | 単　位 | 科目コード | 開講時期 | 授 業 形 態 |
|---|---|---|---|---|---|
| 国際理工学科<br>一般科目<br>選択 | 社会科学（技術者倫理） | 2 | 510400 | 前学期 | 講義/学修 |

| 対象学年 | 担当教員名 | 居室 | 電子メールＩＤ | オフィスアワー |
|---|---|---|---|---|
| 4年 | 増渕隆史 | 金沢C：<br>1.316 | | 月曜 10:35-12:15<br>水曜 13:15-14:55 |

## 授 業 科 目 の 学 習 教 育 目 標

| | キーワード | 学習教育目標 |
|---|---|---|
| 1 | 科学技術者が共有する価値 | 本科目の目的は、科学技術がグローバル化の進む今日の社会および環境に与える影響について考察し、科学技術の目的・役割と社会との相互作用についての理解を深めることである。<br>また、科学技術者が専門職として担う倫理的・社会的責任を検討する。さらに、実務を行う上で直面する倫理的な問題を検討し、それらを解決する問題解決能力の向上を図る。<br>以上の学習を通して、「科学技術者倫理」が単に規範の遵守ではなく、価値のバランスを取りながら「自らがなすべき行動を設計する」という創造的な知的営みであることを学ぶ。 |
| 2 | 専門職倫理と倫理綱領 | |
| 3 | グローバル社会の中の技術者 | |
| 4 | 倫理的意思決定の方法 | |
| 5 | 社会の中の科学技術 | |

## 授業の概要および学習上の助言

本講義は学修単位であるため、1単位を50分45回分の学習とし、50分授業15回に対して50分30回分の自学自習を行って下さい。
この授業ではアクティブラーニングの一環としてグループディスカッションを行います。
1. 概要説明および本科目と既習科目およびICTの教育目的との関係に関する解説
2. なぜ、今、科学技術者の倫理が問われているのか
3. 科学技術者の倫理とは何か／科学技術者が特別の責任を負う理由
4. 科学技術者が意思決定を迫られる状況
5. 科学技術者が重視すべき価値とは何か：専門職集団と倫理綱領
6. 科学技術者としていかに行動すべきか：倫理的問題解決の方法
7. 組織のなかの科学技術者：企業倫理と科学技術者倫理
8. 事例の検討（ケーススタディ）：現実の事例を題材
9. 事例の検討（ケースメソッド）：仮想事例などを通して討議
10. グローバル社会における科学技術者の役割
11. 科学技術者の新しい役割と科学技術者倫理
12. 各専門領域における倫理的問題や事例の検討
・新聞などで報道される科学技術に関わる事件などを科学技術者の倫理の観点から分析する姿勢を持つこと。
・第三者的・評論家的に講義に参加するのではなく、科学技術を担う「当事者」として、「道徳的行為者」としての自覚を持ちながら、講義で提示される問題を自分ならどうするかという観点で考えること。

【教科書および参考書・リザーブドブック】
　教科書：本質から考え行動する科学技術者倫理[白桃書房]
　参考書：　　　　　　　　　　　　　　　　　リザーブドブック：

## 履修に必要な予備知識や技能

・「日本学」をはじめとする他の科目の講義内容と深く関連しているので、復習しておくこと。
・グループディスカッションを行うので、これまでの経験を踏まえて、建設的な議論を進めることができるようにしておくこと。
・この科目では、将来の科学技術を担う者として現代社会と科学技術の関係を考察するため、新聞をしっかり読んで政治、経済、文化、科学技術などの動向に常に関心を払い、自分の問題として考える態度を身に付けておくこと。

| No. | 教育目標(DP)<br>(記号表記) | 学生が達成すべき行動目標 |
|---|---|---|
| ① | b, h | 科学技術と人間社会の在り方（経済活動を含む）との相互作用について、具体的な例を挙げながら説明できる |
| ② | b, c, g | 科学技術者が専門職として実務を行う上で担う責任や共有すべき価値（安全など）について理解し、これを他者に説明できる |
| ③ | b, d, f | 倫理綱領についての知識を持つとともに、企業などが組織として行う倫理対策について説明できる |
| ④ | b, e, h | 倫理的ジレンマを疑似体験し、その問題点を分析するとともに自分の経験や事実関係の調査と関連づけながら考察できる |
| ⑤ | a, b, h | セブン・ステップ・ガイドなどの倫理的問題解決の方法について理解し、これらの方法を具体的な事例において適用できる |
| ⑥ | b, c, i | 本科目の学習教育目標とICTの教育目的・目標、さらに科学技術者が持つべき資質・能力との関係を理解し、自己点検できる |

## 達 成 度 評 価

| 指標と評価割合 評価方法 | 試　験 | クイズ<br>小テスト | レポート | 成果発表<br>口頭・実技 | 作　品 | ポートフォリオ | その他 | 合　計 |
|---|---|---|---|---|---|---|---|---|
| 総合評価割合 | 25 | 15 | 30 | 15 | 0 | 5 | 10 | 100 |
| 総合力指標 知識を取り込む力 | 10 | 7 | 10 | 0 | 0 | 0 | 0 | 27 |
| 総合力指標 思考・推論・創造する力 | 10 | 8 | 10 | 5 | 0 | 0 | 0 | 33 |
| 総合力指標 コラボレーションとリーダーシップ | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 |
| 総合力指標 発表・表現・伝達する力 | 5 | 0 | 5 | 5 | 0 | 0 | 0 | 15 |
| 総合力指標 学習に取組む姿勢・意欲 | 0 | 0 | 5 | 0 | 0 | 5 | 10 | 20 |

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

## 評価の要点

| 評 価 方 法 | 行動目標 | | 評 価 の 実 施 方 法 と 注 意 点 |
|---|---|---|---|
| 試 験 | ① | レ | ・達成度を確認する試験を第14回の時間中に実施する。総合評価に占める割合は25%。受験しない場合は単位を認めない。なお、この試験は「定期試験」ではない。 |
| | ② | レ | |
| | ③ | レ | |
| | ④ | レ | |
| | ⑤ | レ | |
| | ⑥ | | |
| クイズ 小テスト | ① | | ・科目での達成度の指標とするため、授業で検討するケースの倫理的問題構造などを分析する課題、倫理綱領に関する課題、企業倫理プログラムに関する課題を、それぞれ実施（提出）する。 |
| | ② | レ | |
| | ③ | レ | |
| | ④ | レ | |
| | ⑤ | レ | |
| | ⑥ | | |
| レポート | ① | レ | ・本科目の受講を経て倫理的分析能力がどのように変化したかを確認する課題を実施（提出）する。<br>・グループ討議で検討するケースに関して、倫理的な問題の認識、分析能力、倫理的問題解決方法、具体的事例への適応能力等を総合的に問う課題を実施する。<br>・科学技術の専門家として求められる価値観について考察する課題を実施（提出）する。 |
| | ② | レ | |
| | ③ | レ | |
| | ④ | レ | |
| | ⑤ | レ | |
| | ⑥ | レ | |
| 成果発表 （口頭・実技） | ① | | ・数名のグループを作り、討議を行い、倫理的なジレンマを擬似体験することを通じて、倫理的な問題の存在と種類を分析し、道徳的行為者として、エシックステストなどを適切に用いた問題解決方法を確認し、結果を報告する。 |
| | ② | レ | |
| | ③ | レ | |
| | ④ | レ | |
| | ⑤ | レ | |
| | ⑥ | | |
| 作 品 | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| ポートフォリオ | ① | | ・本科目と、ICTの教育・学習目標との関連について自己点検する記述式の課題を適時に実施（提出）する。 |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | レ | |
| その他 | ① | | ・グループ討議には積極的に参加すること。グループ討議への貢献度を相互に評価する。<br>・本科目は毎回の講義への積極的参加を前提としているので、正当な理由のない遅刻や欠席などは減点する。<br>・本科目の授業内容を鑑みて、不正行為には十分に注意すること（自ら不正を、不正とみなされることを含めて行わない事は無論、不正をそそのかしたり、看過したりもしないこと）。これらに該当すると判断された場合は、厳重に対処する。 |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | レ | |

## 具体的な達成の目安

| 理想的な達成レベルの目安 | 標準的な達成レベルの目安 |
|---|---|
| ・科学技術者として直面する可能性のある倫理的な問題の存在と種類について、具体例を挙げながら十分説明できる。<br>・倫理的な想像力、倫理的問題を認識し分析する能力、責任感を向上させる必要性などを、説得力をもって他者に説明できる。<br>・倫理綱領とそこに含まれる価値観について、および企業などが組織として行う倫理対策について具体的に説明できる。<br>・倫理的ジレンマの疑似体験から得たことを、自分の経験や考え方と関連づけながら、建設的に考察することができる。<br>・エシックステストなどの倫理的問題解決の方法について理解し、これらの方法を具体的な事例において十分適用できる。 | ・科学技術に関する倫理的な問題の存在と種類について説明できる。<br>・倫理的な想像力、倫理問題を認識し分析する能力、責任感を向上させる必要性などを説明できる。<br>・倫理綱領についての知識を持つとともに、企業などが組織そして行う倫理対策について説明できる。<br>・倫理綱領とそこに含まれる価値観について、および企業などが組織として行う倫理対策について説明できる。<br>・倫理的ジレンマを疑似体験し、そこから得たことを自分の経験や考え方と関連づけながら考察することができる。<br>・エシックステストなどの倫理的問題解決の方法について理解し、これらの方法を具体的な事例において適用できる。 |

# 授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：「**知識などを取り込む**」→「**知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する**」→「**修得した内容を表現、発表、伝達する**」→「**総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！**」：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

| 回数 日付 | 学習内容 | 授業の運営方法 | 学習課題（予習・復習） | 時間(分) |
|---|---|---|---|---|
| 1 ／ | ※第1～2回では、本科目への導入として、第2回までの「学習内容」の事項について、講義やグループ討議などを通して検討・考察する。<br>・科目の目的・目標、内容、課題、評価方法などに関する解説<br>・本学の教育目的・目標との関連に関する解説<br>・既習科目との関連についての解説 | ・PCを用いた講義<br>・グループ討議<br>・討議結果の発表<br>など | ・復習：初回配布資料や本科目「学習支援計画書」などの熟読<br>・次回に向けた予習：事例分析など | 50<br>150 |
| 2 ／ | （続き）<br>・直面する可能性のある倫理的問題に関する具体例<br>・セブン・ステップ・ガイドの概説　他 | ・PCを用いた講義<br>・グループ討議<br>・討議結果の発表<br>など | ・復習：第1～2回で学んだことについての考察の深化<br>・次回に向けた予習：教科書の精読 | 100<br>100 |
| 3 ／ | ※現実に起きた事例をベースに倫理的考察や意思決定に必要な概念や用語などの解説を行う | ・PCを用いた講義<br>・関連する視聴覚教材の視聴<br>・演習<br>など | ・復習：授業で検討した事例の考察の深化<br>・次回に向けた予習：教科書の精読 | 100<br>100 |
| 4 ／ | ※技術者としていかに行動すべきか<br>・倫理的問題解決の方法<br>・エシックステストおよびセブン・ステップ・ガイドに関する詳細解説<br>・セブン・ステップ・ガイドを用いた演習 | ・PCを用いた講義<br>・関連する視聴覚教材の視聴やグループ討議を行うこともある<br>・演習 | ・復習：セブン・ステップ・ガイドを使った事例分析の練習<br>・次回に向けた予習：次回の授業で検討する事例の概要の把握 | 100<br>100 |
| 5 ／ | ※第5～6回では、ケースメソッド事例に関するグループ討議を経て、第7回の「学習内容」に挙げてある事項についての考察を行う<br>・グループ討議 | ・PCを用いた講義<br>・与えられた事例に関するグループ討議 | ・復習・次回に向けた予習：討議内容についてのさらなる検討 | 150 |
| 6 ／ | ・グループ討議（続き）<br>・討議結果の発表 | ・PCを用いた講義<br>・与えられた事例に関するグループ討議<br>・討議結果の発表<br>など | ・復習：授業内で行った事例に関する考察の深化<br>・次回に向けた予習：教科書の精読 | 150<br>100 |
| 7 ／ | ※技術者としていかに行動すべきか<br>※優れた意思決定がもたらすもの | ・PCを用いた講義<br>・関連する視聴覚教材を視聴することもある | ・復習：倫理綱領についての考察の深化<br>・次回に向けた予習：教科書の精読 | 120<br>80 |
| 8 ／ | ※なぜ、科学技術者倫理が求められているのか | ・PCを用いた講義<br>・関連する視聴覚教材を視聴することもある | ・復習：企業の倫理的取組みについての考察の深化<br>・次回に向けた予習：教科書の精読 | 120<br>80 |
| 9 ／ | ※第9～10回では、ケースメソッド事例に関するグループ討議を経て、第11～12回の「学習内容」に挙げてある事項についての考察を行う<br>・グループ討議 | ・PCを用いた講義<br>・与えられた事例に関するグループ討議 | ・復習・次回に向けた予習<br>・討議内容についてのさらなる検討 | 150 |
| 10 ／ | ・グループ討議（続き）<br>・討議結果の発表 | ・PCを用いた講義<br>・与えられた事例に関するグループ討議<br>・討議結果の発表<br>など | ・復習：授業内で行った事例に関する考察の深化<br>・次回に向けた予習：教科書の精読 | 150<br>100 |

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| 回数 日付 | 学習内容 | 授業の運営方法 | 学習課題（予習・復習） | 時間(分) |
|---|---|---|---|---|
| 11 ／ | ※Reflection（専門分野特有の問題に関する志向倫理的検討など） | ・PCを用いた講義 ・関連する視聴覚教材を聴講など | ・復習：授業内で行った事例に関する考察の深化 ・次回に向けた予習：教科書の精読 | 100 100 |
| 12 ／ | ※高度技術社会における技術者の新しい役割 | ・PCを用いた講義 ・関連する視聴覚教材を聴講など | ・復習：教科書の精読 ・次回に向けた予習：科学技術の専門家として求められる価値観に関する考察 | 100 100 |
| 13 ／ | ※本質から考え行動する科学技術者倫理 | ・PCを用いた講義 | ・復習：これまでの授業内容の振り返り | 200 |
| 14 ／ | ※これまでの授業の要点解説と達成度確認 | ・これまでの授業の要点解説 ・達成度確認テストの実施 | ・予習：テストの準備 ・復習：これまでの授業内容の振り返り ・次回に向けた予習：ポートフォリオを用いた振り返り | 100 100 60 |
| 15 ／ | ※まとめと自己点検 | ・PCを用いた講義（成績概要の説明など） ・授業アンケートへの回答 | ・教科書での授業全体の復習 | 140 |

「担当教員名」欄の＊＝実務経験のある教員

| 授業科目区分 | 科　目　名 | | 単位 | 科目コード | 開講時期 | 授　業　形　態 |
|---|---|---|---|---|---|---|
| 国際理工学科<br>一般科目<br>選択 | 人文科学 | | 2 | 510500 | 後学期 | 講義／学修 |

| 対象学年 | 担当教員名 | 居室 | 電子メールＩＤ | オフィスアワー |
|---|---|---|---|---|
| 4年 | 平泉　紀房 / 清水　節 | 21・604<br>21・605 | | 授業時に予約 |

## 授 業 科 目 の 学 習 教 育 目 標

| | キーワード | 学習教育目標 |
|---|---|---|
| 1 | 日本の歴史 | 日本における歴史上の人物の生涯を学ぶことで、その生き方・考え方を知り、それらを通して日本人の特質・行動規範などについて理解し、今後の自身の問題と照らし合わせて考える。さらに、各種神話や建国伝承を学ぶことで、多様な価値観の存在を知るとともに、日本人の特質を考える。一方、諸外国のもつ多様な文化・価値観にも眼を向け、日本と異なる歴史や文化・伝統を公平に評価できる真摯な姿勢の大切さを学ぶ。これらのことを通じて、「読む・聞く・考える・書く」といった基礎的能力の向上を図る。 |
| 2 | 日本の神話 | |
| 3 | 日本人の特質、国民性 | |
| 4 | 比較文化 | |
| 5 | 多様な価値観 | |

## 授業の概要および学習上の助言

本講義は学修単位であるため、１単位を50分45回分の学習とし、100分授業15回に対して100分30回分の自学自習を行って下さい。
この授業ではアクティブラーニングの一環として調査学習、グループワークを行います。
☆本科目の授業概要は以下の通りである。
第1回〜第7回目　テーマ：日本人の生き方・考え方に学ぶ。（平泉担当）
１．日本の歴史上の人物に関する講義を聴き、その人物の生き方・考え方（行動規範）に学ぶ。
２．日本の神話と世界の神話を比較して、日本人の特質を考える。
３．日本の建国伝承から、国の成り立ちと建国の理想について学ぶ。
第8回目授業　テーマ：地域の歴史・文化を学ぶ。（清水担当）
４．白山と白山信仰について学習する。
第9回〜第15回　テーマ：国際比較から日本の特質を考える。（清水担当）
５．日本、および日本人の特色や特質について、歴史や比較文化の観点から学ぶ。
６．グループ活動で「日本と外国」「過去と現在」の比較調査を行い、討議した成果を発表する。
７．相互評価を行って、自身の学習成果について振り返りを行う。
※30分以上の遅刻は、欠席となります。

【教科書および参考書・リザーブドブック】
　教科書：指定なし
　参考書：指定なし
　リザーブドブック：世界主要国価値観データブック〔同友館〕

## 履修に必要な予備知識や技能

　１．予習内容と聴講内容とを総合して理解し、提示されたテーマについて考察する能力
　２．適切な日本語で文章にまとめる能力
　３．グループ討議に積極的に参加する姿勢、および調査・考察・発表を行うための基礎能力

| №. | 教育目標(DP)<br>(記号表記) | 学生が達成すべき行動目標 |
|---|---|---|
| ① | e | 歴史上の人物から学んだ、生き方・考え方について、適切な日本語の文章で説明できる。 |
| ② | e | 日本・日本人の特質について、学習内容や調査内容をもとに適切な日本語の文章で説明できる。 |
| ③ | e | 日本の建国伝承から学んだ国の成り立ちと建国の理想について、適切な日本語の文章で説明できる。 |
| ④ | e | 海外の人々が多様な価値観をもっていることについて理解を深めることができる。 |
| ⑤ | e | グループ討議・発表を通じて、自己の見解を口頭および文章で表現することができる。 |
| ⑥ | i | 本科目における学生の達成すべき行動目標を自己評価できる。 |

## 達 成 度 評 価

| 指標と評価割合 | 評価方法 | 試　験 | クイズ<br>小テスト | レポート | 成果発表<br>口頭・実技 | 作　品 | ポートフォリオ | その他 | 合　計 |
|---|---|---|---|---|---|---|---|---|---|
| | 総合評価割合 | 0 | 0 | 62 | 20 | 0 | 10 | 8 | 100 |
| 総合力指標 | 知識を取り込む力 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 25 |
| | 思考・推論・創造する力 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 25 |
| | コラボレーションとリーダーシップ | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 10 |
| | 発表・表現・伝達する力 | 0 | 0 | 12 | 10 | 0 | 0 | 0 | 22 |
| | 学習に取組む姿勢・意欲 | 0 | 0 | 0 | 0 | 0 | 10 | 8 | 18 |

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

## 評価の要点

| 評 価 方 法 | 行動目標 | | 評 価 の 実 施 方 法 と 注 意 点 |
|---|---|---|---|
| 試 験 | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| クイズ 小テスト | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| レポート | ① | ✓ | 「授業レポート」用紙を配布する。 |
| | ② | ✓ | それに記述された内容で、行動目標の達成度を確認・評価して返却する。 |
| | ③ | ✓ | 第1回〜第7回（6点×7回、計42点） |
| | ④ | ✓ | 第9回〜第15回（5点×4回、計20点） |
| | ⑤ | ✓ | 「授業レポート」用紙の注意事項（評価基準）をよく読んで作成する。 |
| | ⑥ | | 不明な点は教員に質問をする。 |
| 成果発表 （口頭・実技） | ① | | グループ内で分担調査し、討議する。（5点） |
| | ② | ✓ | その成果をプレゼンテーションする。（10点） |
| | ③ | | 発表について相互評価を行う。（5点） |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | | |
| 作 品 | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| ポートフォリオ | ① | | 本科目における学生の達成すべき行動目標を自己評価する。 |
| | ② | | 自己評価レポート（10点） |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | ✓ | |
| その他 | ① | ✓ | 「授業レポート」の期日外提出（やむを得ない事情がある場合を除く）や、グループ活動時の取り組みで問題が見られる場合は、減点方式で評価をする。 |
| | ② | ✓ | |
| | ③ | ✓ | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |

## 具体的な達成の目安

| 理想的な達成レベルの目安 | 標準的な達成レベルの目安 |
|---|---|
| 行動目標<br>①②③④「授業レポート」において、課題の主旨と条件を満たし、評価基準に合致した適切な日本語の文章で、講義内容の要点および考察を具体的に記述できる。<br>②④⑤グループ活動を通じて、日本と外国の比較調査を行い、その成果を明快に口頭発表することができる。<br>⑥自己の達成度を適切な日本語表現で、明快に論述できる。 | 行動目標<br>①②③④「授業レポート」において、課題の主旨と条件を満たし、評価基準に合致したある程度適切な日本語の文章で、講義内容の要点および考察を記述できる。<br>②④⑤グループ活動を通じて、日本と外国の比較調査を行い、その成果を口頭発表することができる。<br>⑥自己の達成度を適切な日本語表現で論述できる。 |

# 授業明細表

CLIP学習プロセスについて

一般に、授業あるいは課外での学習では：「**知識などを取り込む**」→「**知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する**」→「**修得した内容を表現、発表、伝達する**」→「**総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！**」：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

| 回数<br>日付 | 学習内容 | 授業の運営方法 | 学習課題（予習・復習） | 時間（分） |
|---|---|---|---|---|
| 1<br>／ | ☆科目説明（ガイダンス）<br>本科目の概要及び授業運営についての説明を行う。<br>☆日本人の生き方・考え方に学ぶ<br>担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。 | 講義と質疑<br>授業レポート作成 | 復習：学習支援計画書や各種配布資料により、科目の教育目的と行動目標を確認する。 | 100 |
| 2<br>／ | ☆日本人の生き方・考え方に学ぶ<br>担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ提出する。 | 前回の自己点検<br>講義と質疑<br>授業レポート作成 | 予習：『日本学資料集』の指定ページ部分を読んで理解してくる。<br>復習：返却された「授業レポート」を見直し、内容を確認する。 | 120<br>60 |
| 3<br>／ | ☆日本人の生き方・考え方に学ぶ<br>担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。 | 前回の自己点検<br>講義と質疑<br>授業レポート作成 | 予習：『日本学資料集』の指定ページ部分を読んで理解してくる。<br>復習：返却された「授業レポート」を見直し、内容を確認する。 | 120<br>60 |
| 4<br>／ | ☆日本人の生き方・考え方に学ぶ<br>担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。 | 前回の自己点検<br>講義と質疑<br>授業レポート作成 | 予習：『日本学資料集』の指定ページ部分を読んで理解してくる。<br>復習：返却された「授業レポート」を見直し、内容を確認する。 | 120<br>60 |
| 5<br>／ | ☆日本人の生き方・考え方に学ぶ<br>担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。 | 前回の自己点検<br>講義と質疑<br>授業レポート作成 | 予習：『日本学資料集』の指定ページ部分を読んで理解してくる。<br>復習：返却された「授業レポート」を見直し、内容を確認する。 | 120<br>60 |
| 6<br>／ | ☆日本人の生き方・考え方に学ぶ<br>担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。 | 前回の自己点検<br>講義と質疑<br>授業レポート作成 | 予習：『日本学資料集』の指定ページ部分を読んで理解してくる。<br>復習：返却された「授業レポート」を見直し、内容を確認する。 | 120<br>60 |
| 7<br>／ | ☆日本人の生き方・考え方に学ぶ<br>担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。 | 前回の自己点検<br>講義と質疑<br>授業レポート作成 | ポートフォリオを提出する。 | 200 |
| 8<br>／ | ☆地域の歴史・文化を学ぶ<br>オンラインで講義動画を視聴する<br>白山・白山信仰について学習する。 | オンライン講義<br>教室での授業は行わない。<br>各自で講義動画を視聴し、聴講メモを作成する。 | 聴講メモの作成 | 200 |
| 9<br>／ | ☆第9回目以降の授業について（ガイダンス）<br>第9回目以降の授業目的・意義・運営方法について解説する。<br><br>☆国際比較から日本の特質を考える<br>担当教員による講義を聴講する。取りあげるテーマや人物は、クラスや学科の特性に合わせる。 | 講義と質疑<br>演習（レポート作成） | テキストの予習<br><br>レポート作成準備 | 100<br><br>100 |
| 10<br>／ | ☆国際比較から日本の特質を考える<br>担当教員による講義を聴講する。取りあげるテーマや人物は、クラスや学科の特性に合わせる。<br><br>☆講義レポートの返却、学習成果の振り返り | 講義と質疑<br>演習（レポート作成） | テキストの予習<br><br>レポート作成準備 | 100<br><br>100 |

ＣＬＩＰ学習プロセスについて

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※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

| 回数<br>日付 | 学習内容 | 授業の運営方法 | 学習課題（予習・復習） | 時間(分) |
|---|---|---|---|---|
| 11<br><br>／ | ☆国際比較から日本の特質を考える<br>担当教員による講義を聴講する。取りあげるテーマや人物は、クラスや学科の特性に合わせる。<br><br><br>☆講義レポートの返却、学習成果の振り返り | 講義と質疑<br>演習（レポート作成） | テキストの予習<br><br>レポート作成準備 | 100<br><br>100 |
| 12<br><br>／ | ☆国際比較から日本の特質を考える<br>グループ討議①<br>討議テーマに関する解説、および調査・考察・発表の方法について説明する。<br>また、インターネットやライブラリーセンターの蔵書などを活用し、官庁や研究所が公表している各種調査データを分析検討する。なお、各自で調査・考察した成果をグループ討議レポートにまとめる。 | 講義と質疑、演習<br>ノートパソコン、LANケーブルを持参する。 | 収集資料の整理と分析<br><br>プレゼンテーション準備<br><br>グループ討議レポートの作成 | 120<br><br>120<br><br>120 |
| 13<br><br>／ | ☆国際比較から日本の特質を考える<br>グループ討議②<br>前回に続いて、グループ活動（調査・討議・発表準備）を行う。各自で調査・考察した成果をグループ討議レポートにまとめる。また、グループとして発表内容をまとめ、パワーポイントを作成する。 | 講義と質疑、演習<br>ノートパソコン、LANケーブルを持参する。 | 収集資料の整理と分析<br><br>プレゼンテーション準備<br><br>グループ討議レポートの作成 | 120<br><br>120<br><br>120 |
| 14<br><br>／ | ☆国際比較から日本の特質を考える<br>グループ発表①<br>各グループの成果を発表し、質疑応答と相互評価を実施する。 | 演習（発表と質疑応答）<br>発表評価シートの作成<br>発表の反省<br>自己評価レポートの作成<br>グループ討議レポートの提出 | 発表評価シートの作成<br><br>発表の反省<br><br>自己評価レポートの作成 | 100<br><br>30<br><br>100 |
| 15<br><br>／ | ☆国際比較から日本の特質を考える<br>グループ発表②<br>各グループの成果を発表し、質疑応答と相互評価を実施する。<br><br>☆自己点検<br>これまでの学習成果について、教員・学生相互で確認を行う。 | 演習（発表と質疑応答）<br>自己評価レポートの提出 | 発表評価シートの作成<br><br>発表の反省 | 100<br><br>30 |

# 2025 Syllabus

| Field | Course Name | | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|---|
| Dept. S General Required | Mathematical Statistics | | 2 | 510700 | First | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | TANIGUCHI, Tetsuya | Kanazawa C:23.403 | | Make an appointment in class |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Probability<br>2 Conditional Probability<br>3 Probability Distribution<br>4 Estimation<br>5 Hypothesis Testing | Students will<br>(1) acquire basic knowledge of probability.<br>(2) learn probability calculations.<br>(3) learn typical distribution functions such as the normal distribution, Student's t-distribution.<br>(4) learn methods for interval estimation and hypothesis testing. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.

This course covers statistical analysis of data, progressing from basic probability concepts to statistical inference. Topics include:

1. Probability and Random Variables
(1) Event and Sample Space,    (2) Probability and Conditional Probability
(3) Random Variables and Probability Distribution Functions,    (4) Typical Probability Distribution Functions
2. Descriptive Statistics
(1) Frequency Distribution Table and Histogram,    (2) Average
3. Interval Estimation and Hypothesis Testing
(1) Population and Sample,    (2) Interval Estimation of Population Mean
(3) Hypothesis Testing of Population Mean

Students are required to actively participate in the class and check KIT Inside website for materials before each class.

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Introductory Statistics (OpenStax) https://openstax.org/details/introductory-statistics (license: CC-BY)
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Knowledge of basic calculus.
- Foundation in basic calculus (differentiation and integration)
- Understanding of basic mathematical notation techniques
- Familiarity with mathematical software (optional but recommended)

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | h | Be able to understand the concept of probability and calculate probability using the laws of probability. |
| ② | h | Be able to calculate mean and variance for random variables. |
| ③ | h | Be able to analyze data by calculating the necessary statistics from data. |
| ④ | h | Be able to estimate and test population mean, variance using a sample distribution. |
| ⑤ | i | Understand the meanings of fundamental English words for statistics. |
| ⑥ | i | Be able to understand the contents of each class, work on assigned tasks, and attend every class. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 60 | 20 | 0 | 0 | 0 | 20 | 100 |
| Ability to capture knowledge | 0 | 40 | 10 | 0 | 0 | 0 | 10 | 60 |
| Ability to think, reason and create | 0 | 20 | 5 | 0 | 0 | 0 | 0 | 25 |
| Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Attitude and motivation for learning | 0 | 0 | 5 | 0 | 0 | 0 | 10 | 15 |

(Comprehensive Strength Criteria)

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | ∟ | There will be three quizzes. Each of the 1st and 2nd quizzes will comprise 15% of the overall evaluation, and the final quiz will comprise 30% (for a total of 30+30%). The final quiz will be given at the end of the semester to assess the degree of student achievement. |
| | ② | ∟ | |
| | ③ | ∟ | |
| | ④ | ∟ | |
| | ⑤ | ∟ | |
| | ⑥ | | |
| Reports | ① | ∟ | A report will be assigned and will comprise 20% of the overall evaluation. The report should be written carefully with text, mathematical formulas, numerical values, graphs, etc. It should logically describe the process of tackling the problem. Copying the reports of others is not permitted. The submission date is to be strictly observed. Details for each assignment and the grading criteria will be announced in class. |
| | ② | ∟ | |
| | ③ | ∟ | |
| | ④ | ∟ | |
| | ⑤ | ∟ | |
| | ⑥ | | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | ∟ | Students will be evaluated on motivation, attitude and commitment to task. This will comprise 20% of the overall (term) evaluation. |
| | ② | ∟ | |
| | ③ | ∟ | |
| | ④ | ∟ | |
| | ⑤ | ∟ | |
| | ⑥ | ∟ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| (1) Understand the concept of probability correctly and be able to calculate probabilities appropriately. (2) Understand the meaning of random variables appropriately and calculate the mean and variance of a probability distribution. (3) Use common probability distributions to calculate probabilities in various situations. (4) Correctly calculate the statistical values required for data analysis. (5) Perform appropriate interval estimation and hypothesis testing using a sample distribution. (6) Apply course contents to various statistical problems. | (1) Understand the concept of probability and be able to calculate probabilities. (2) Understand the meaning of random variables and calculate the mean and variance of a probability distribution. (3) Calculate probability using common probability distributions. (4) Calculate the statistical values required for data analysis. (5) Perform interval estimation and hypothesis testing using a sample distribution. (6) Apply course contents to statistical problems. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Course introduction<br>Basic statistics<br>Basics of probability | Lecture, practice | Understand the syllabus of this course. Review the content of the lecture. Prepare for the next class. | 200 |
| 2 / | Basics of probability<br>Conditional probability | Lecture, practice, interactive activities | Review the content of the lecture. Prepare for the next class. | 200 |
| 3 / | Conditional probabilities | Lecture, practice, interactive activities | Review the content of the lecture. Prepare for the next class. | 200 |
| 4 / | Random variables and probability distributions | Lecture, practice, interactive activities | Review the content of the lecture. Prepare for the next class. | 200 |
| 5 / | Quiz (classes 1 to 4, written examination)<br>Mean and variance of a random variable | Implementation of quiz<br>Lecture, practice, interactive activities | Review the content of the lecture. Prepare for the next class. | 200 |
| 6 / | Common probability distributions (binomial distribution) | Self-check<br>Lecture, practice, interactive activities<br>Review and self-reflection<br>Returning quiz papers | Review the content of the lecture. Prepare for the next class. | 200 |
| 7 / | Common probability distributions (standard normal distribution, normal distribution) | Lecture, practice, interactive activities | Review the content of the lecture. Prepare for the next class. | 200 |
| 8 / | Common probability distributions (normal distribution, Student's t-distribution) | Lecture, practice, interactive activities | Review the content of the lecture. Prepare for the next class. | 200 |
| 9 / | Quiz (classes 5 to 8, written examination)<br>Basic concept of speculative statistics Population and sample<br>Basic concept of estimation and testing | Implementation of quiz<br>Lecture, practice, interactive activities | Review the content of the lecture. Prepare for the next class. | 200 |
| 10 / | Interval estimation of population mean | Self-check<br>Lecture, practice, interactive activities<br>Review and self-reflection<br>Returning quiz papers | Review the content of the lecture. Prepare for the next class. | 200 |

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Interval estimation of population mean<br>Concept of hypothesis testing<br>Test of population mean | Implementation of quiz<br>Lecture, practice, interactive activities | Review the content of the lecture. Prepare for the next class. | 200 |
| 12 / | z test of population mean<br>Organization and analysis of data<br>Report (Interval estimate and hypothesis test. Analyze the data collected by each student.) | Lecture, practice, interactive activities | Review the content of the lecture. Prepare for the next class. | 200 |
| 13 / | t test of population mean<br>Organization and analysis of data<br>Report (Interval estimate and hypothesis test. Analyze the data collected by each student.) | Lecture, practice, interactive activities<br>Review and self-reflection | Review the content of the lecture. Prepare for the next class. | 200 |
| 14 / | Final quiz | Quiz on contents of # 1 - # 13<br>Self-study / Q&A | | 200 |
| 15 / | Final quiz return<br>Self-reflection on class<br>Self-evaluation | Return final quiz results and reports on integrated subject | Review the content of the lecture. | 200 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S General Required | Comprehensive English IA (a) | 1 | 511000 | First | Lecture Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | REYNOLDS, Stephanie | Kanazawa C: 31.104 | | TBA |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Critical Thinking<br>2 Communication<br>3 Engineering<br>4 Writing<br>5 Presentation | In this course, students will be able to improve English communication skills while sharing opinions in discussions, writing, and presentations. Students will learn critical thinking skills and gain knowledge about various topics related to engineering. Additionally, students will learn and apply effective and appropriate communication strategies in discussions, presentations, and writing. |

## Course Description and Expectations for Students (10.5pt)

This course will offer discussion, group work, and reflection as types of active learning.
Students will prepare and participate in English discussions using the language skills that are already known.
Students will practice and apply new strategies for effective communication in discussions, presentations, and writing.
Students will write one reaction/response essay and prepare one collaborative, research-based presentation.

It will be important for students to share their own opinions in relation to information from a variety of sources. Therefore, students will learn how to appropriately reference and cite sources.
Students should be prepared with a binder or folder to keep handouts, writing tools for in-class work, and laptop computers for preparing presentations, researching related information, downloading class materials, and submitting online assignments.

### Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:  None (Handouts)
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Intermediate English ability
Basic computer skills

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | d | Students will be able to share opinions and ideas through discussions in English. |
| ② | h | Students will be able to think critically about various topics related to computer science and robotics. |
| ③ | g | Students will be able to write a reaction/response essay. |
| ④ | c | Students will be able to make presentations in English. |
| ⑤ | c | Students will be able to apply effective communication strategies in presentations and writing. |
| ⑥ | b | Students will be able to reference and cite sources appropriately. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 20 | 30 | 30 | 0 | 20 | 0 | 100 |
| Ability to capture knowledge | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| Ability to think, reason and create | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| Collaboration and leadership | 0 | 0 | 0 | 10 | 0 | 5 | 0 | 15 |
| Announcement / Expression / Communication | 0 | 5 | 10 | 10 | 0 | 0 | 0 | 25 |
| Attitude and motivation for learning | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 10 |

(The left vertical label for the bottom five rows reads "Comprehensive Strength Criteria")

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | | Vocabulary, skill review, written response, and/or reading/listening comprehension quizzes based on the content of class activities and assignments (20%): |
| | ② | ⌐ | |
| | ③ | | |
| | ④ | | Feedback will be given during the next class session. |
| | ⑤ | ⌐ | |
| | ⑥ | | |
| Reports | ① | | One reaction/response essay (30%) Essay includes an outline, first draft, 2 writing conferences, and final draft. |
| | ② | ⌐ | |
| | ③ | ⌐ | |
| | ④ | | Feedback will be given during the next class session. |
| | ⑤ | ⌐ | |
| | ⑥ | ⌐ | |
| Presentations | ① | | One roundtable discussion/presentation project (30%) Project includes an outline, delivery & participation in discussion, and self-evaluation/reflection. |
| | ② | ⌐ | |
| | ③ | | |
| | ④ | ⌐ | Feedback will be given during the next class session. |
| | ⑤ | ⌐ | |
| | ⑥ | ⌐ | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | ⌐ | In-class or assignment handouts for preparation and review of discussion activities (20%) |
| | ② | ⌐ | |
| | ③ | | Feedback will be given during the next class session. |
| | ④ | | |
| | ⑤ | ⌐ | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Professional-level, academic writing and presentations. Discuss 100% in fluent English. | Comprehensible writing and presentations. Discussions mostly in English. |

# Course Schedule

\* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Introduction/Reading I<br>Students will be introduced to the syllabus and contents of the course. Students will participate in brainstorming and background building communication activities. | Brainstorming as a pre-reading technique, individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities.<br>Reading I – Part 1 | 50 |
| 2 / | Quiz<br>Theme I: Ethics & Information (1)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading I – Part 2 | 50 |
| 3 / | Quiz<br>Theme I: Ethics & Information (2)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading I – Part 3 | 50 |
| 4 / | Quiz<br>Theme I: Ethics & Information (3)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading I – Part 4 | 50 |
| 5 / | Quiz<br>Theme I: Ethics & Information (4)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities. | 50 |
| 6 / | Reaction/Response<br>Students will brainstorm ideas and opinions. Students will research related information to support their ideas and learn how to appropriately reference sources to write a reaction/response essay. *Outline Returned* | Individual, pair, and group work; discussion | Review: Complete Reaction/Response Essay Draft 1 | 50 |
| 7 / | Reaction/Response<br>Students will brainstorm ideas and opinions. Students will research related information to support their ideas and learn how to appropriately reference sources to write a reaction/response essay. *Draft 1 Returned* | Individual, pair, and group work; discussion | Review: Complete Reaction/Response Essay Final Draft due Class 9 | 50 |
| 8 / | Reading II<br>Students will participate in brainstorming and background building communication activities. | Individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities.<br>Reading II – Part 1 | 50 |
| 9 / | Quiz<br>Theme: Artificial Intelligence (1)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading II – Part 2 | 50 |
| 10 / | Quiz<br>Theme: Artificial Intelligence (2)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading II – Part 3 | 50 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Quiz<br>Theme: Artificial Intelligence (3)<br>Students will review and discuss topics related to the reading or videos.<br>*Reaction/Response Essay Returned* | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading II – Part 4 | 50 |
| 12 / | Quiz<br>Theme: Artificial Intelligence (4)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading II – Part 5 | 50 |
| 13 / | Roundtable Discussion/Presentation<br>Students will brainstorm ideas and opinions. Students will research related information to support their ideas and learn how to appropriately reference sources to participate in a roundtable discussion. | Individual, pair, and group work; discussion | Review: Complete Discussion Outline | 50 |
| 14 / | Roundtable Discussion/Presentation<br>Students will present and discuss ideas, opinions, and research related to the topic in a roundtable discussion.<br>Students will complete a written reflection. | Individual, pair, and group work; discussion | Review: Complete written reflection | 50 |
| 15 / | Self-Evaluation<br>Students will be given oral and written feedback both overall and individually on their work. Students will also be encouraged to share their feedback about the course.<br>*Presentation evaluation returned* | Individual, pair, and group work; discussion | | |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S General Required | Comprehensive English IA (b) | 1 | 511000 | First | Lecture Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | REYNOLDS, Stephanie | Kanazawa C: 31.104 | | TBA |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Critical Thinking <br> 2 Communication <br> 3 Engineering <br> 4 Writing <br> 5 Presentation | In this course, students will be able to improve English communication skills while sharing opinions in discussions, writing, and presentations. Students will learn critical thinking skills and gain knowledge about various topics related to engineering. Additionally, students will learn and apply effective and appropriate communication strategies in discussions, presentations, and writing. |

## Course Description and Expectations for Students (10.5pt)

This course will offer discussion, group work, and reflection as types of active learning.
Students will prepare and participate in English discussions using the language skills that are already known.
Students will practice and apply new strategies for effective communication in discussions, presentations, and writing.
Students will write one reaction/response essay and prepare one collaborative, research-based presentation.

It will be important for students to share their own opinions in relation to information from a variety of sources. Therefore, students will learn how to appropriately reference and cite sources.
Students should be prepared with a binder or folder to keep handouts, writing tools for in-class work, and laptop computers for preparing presentations, researching related information, downloading class materials, and submitting online assignments.

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: None (Handouts)
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Intermediate English ability
Basic computer skills

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | d | Students will be able to share opinions and ideas through discussions in English. |
| ② | h | Students will be able to think critically about various topics related to computer science and robotics. |
| ③ | g | Students will be able to write a reaction/response essay. |
| ④ | c | Students will be able to make presentations in English. |
| ⑤ | c | Students will be able to apply effective communication strategies in presentations and writing. |
| ⑥ | b | Students will be able to reference and cite sources appropriately. |

## Evaluation Criteria

| | Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Total Evaluation Ratio | 0 | 20 | 30 | 30 | 0 | 20 | 0 | 100 |
| Comprehensive Strength Criteria | Ability to capture knowledge | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| | Ability to think, reason and create | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| | Collaboration and leadership | 0 | 0 | 0 | 10 | 0 | 5 | 0 | 15 |
| | Announcement / Expression / Communication | 0 | 5 | 10 | 10 | 0 | 0 | 0 | 25 |
| | Attitude and motivation for learning | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 10 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | | Vocabulary, skill review, written response, and/or reading/listening comprehension quizzes based on the content of class activities and assignments (20%): |
| | ② | ∟ | |
| | ③ | | |
| | ④ | | Feedback will be given during the next class session. |
| | ⑤ | ∟ | |
| | ⑥ | | |
| Reports | ① | | One reaction/response essay (30%) |
| | ② | ∟ | Essay includes an outline, first draft, 2 writing conferences, and final draft. |
| | ③ | ∟ | |
| | ④ | | Feedback will be given during the next class session. |
| | ⑤ | ∟ | |
| | ⑥ | ∟ | |
| Presentations | ① | | One roundtable discussion/presentation project (30%) |
| | ② | ∟ | Project includes an outline, delivery & participation in discussion, and self-evaluation/reflection. |
| | ③ | | |
| | ④ | ∟ | |
| | ⑤ | ∟ | Feedback will be given during the next class session. |
| | ⑥ | ∟ | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | ∟ | In-class or assignment handouts for preparation and review of discussion activities (20%) |
| | ② | ∟ | |
| | ③ | | Feedback will be given during the next class session. |
| | ④ | | |
| | ⑤ | ∟ | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Professional-level, academic writing and presentations. Discuss 100% in fluent English. | Comprehensible writing and presentations. Discussions mostly in English. |

# Course Schedule

\* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Introduction/Reading I<br>Students will be introduced to the syllabus and contents of the course. Students will participate in brainstorming and background building communication activities. | Brainstorming as a pre-reading technique, individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities.<br>Reading I – Part 1 | 50 |
| 2 / | Quiz<br>Theme I: Ethics & Information (1)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading I – Part 2 | 50 |
| 3 / | Quiz<br>Theme I: Ethics & Information (2)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading I – Part 3 | 50 |
| 4 / | Quiz<br>Theme I: Ethics & Information (3)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading I – Part 4 | 50 |
| 5 / | Quiz<br>Theme I: Ethics & Information (4)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities. | 50 |
| 6 / | Reaction/Response<br>Students will brainstorm ideas and opinions. Students will research related information to support their ideas and learn how to appropriately reference sources to write a reaction/response essay. *Outline Returned* | Individual, pair, and group work; discussion | Review: Complete Reaction/Response Essay Draft 1 | 50 |
| 7 / | Reaction/Response<br>Students will brainstorm ideas and opinions. Students will research related information to support their ideas and learn how to appropriately reference sources to write a reaction/response essay. *Draft 1 Returned* | Individual, pair, and group work; discussion | Review: Complete Reaction/Response Essay Final Draft due Class 9 | 50 |
| 8 / | Reading II<br>Students will participate in brainstorming and background building communication activities. | Individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities.<br>Reading II – Part 1 | 50 |
| 9 / | Quiz<br>Theme: Artificial Intelligence (1)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading II – Part 2 | 50 |
| 10 / | Quiz<br>Theme: Artificial Intelligence (2)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading II – Part 3 | 50 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Quiz<br>Theme: Artificial Intelligence (3)<br>Students will review and discuss topics related to the reading or videos.<br>*Reaction/Response Essay Returned* | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading II – Part 4 | 50 |
| 12 / | Quiz<br>Theme: Artificial Intelligence (4)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading II – Part 5 | 50 |
| 13 / | Roundtable Discussion/Presentation<br>Students will brainstorm ideas and opinions.<br>Students will research related information to support their ideas and learn how to appropriately reference sources to participate in a roundtable discussion. | Individual, pair, and group work; discussion | Review: Complete Discussion Outline | 50 |
| 14 / | Roundtable Discussion/Presentation<br>Students will present and discuss ideas, opinions, and research related to the topic in a roundtable discussion.<br>Students will complete a written reflection. | Individual, pair, and group work; discussion | Review: Complete written reflection | 50 |
| 15 / | Self-Evaluation<br>Students will be given oral and written feedback both overall and individually on their work.<br>Students will also be encouraged to share their feedback about the course.<br>*Presentation evaluation returned* | Individual, pair, and group work; discussion | | |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S General Required | Comprehensive English IA (c) | 1 | 511000 | First | Lecture Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | UTSUNOMIYA, Takako | Kanazawa C: 31.104 | | TBA |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Critical Thinking<br>2 Communication<br>3 Engineering<br>4 Writing<br>5 Presentation | In this course, students will be able to improve English communication skills while sharing opinions in discussions, writing, and presentations. Students will learn critical thinking skills and gain knowledge about various topics related to engineering. Additionally, students will learn and apply effective and appropriate communication strategies in discussions, presentations, and writing. |

## Course Description and Expectations for Students (10.5pt)

This course will offer discussion, group work, and reflection as types of active learning.
Students will prepare and participate in English discussions using the language skills that are already known.
Students will practice and apply new strategies for effective communication in discussions, presentations, and writing.
Students will write one reaction/response essay and prepare one collaborative, research-based presentation.

It will be important for students to share their own opinions in relation to information from a variety of sources. Therefore, students will learn how to appropriately reference and cite sources.
Students should be prepared with a binder or folder to keep handouts, writing tools for in-class work, and laptop computers for preparing presentations, researching related information, downloading class materials, and submitting online assignments.

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:   None (Handouts)
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Intermediate English ability
Basic computer skills

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | d | Students will be able to share opinions and ideas through discussions in English. |
| ② | h | Students will be able to think critically about various topics related to computer science and robotics. |
| ③ | g | Students will be able to write a reaction/response essay. |
| ④ | c | Students will be able to make presentations in English. |
| ⑤ | c | Students will be able to apply effective communication strategies in presentations and writing. |
| ⑥ | b | Students will be able to reference and cite sources appropriately. |

## Evaluation Criteria

| | Evaluation Method<br>Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Total Evaluation Ratio | 0 | 20 | 30 | 30 | 0 | 20 | 0 | 100 |
| Comprehensive Strength Criteria | Ability to capture knowledge | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| | Ability to think, reason and create | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| | Collaboration and leadership | 0 | 0 | 0 | 10 | 0 | 5 | 0 | 15 |
| | Announcement / Expression / Communication | 0 | 5 | 10 | 10 | 0 | 0 | 0 | 25 |
| | Attitude and motivation for learning | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 10 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | | Vocabulary, skill review, written response, and/or reading/listening comprehension quizzes based on the content of class activities and assignments (20%):<br><br>Feedback will be given during the next class session. |
| | ② | ∟ | |
| | ③ | | |
| | ④ | | |
| | ⑤ | ∟ | |
| | ⑥ | | |
| Reports | ① | | One reaction/response essay (30%)<br>Essay includes an outline, first draft, 2 writing conferences, and final draft.<br><br>Feedback will be given during the next class session. |
| | ② | ∟ | |
| | ③ | ∟ | |
| | ④ | | |
| | ⑤ | ∟ | |
| | ⑥ | ∟ | |
| Presentations | ① | | One roundtable discussion/presentation project (30%)<br>Project includes an outline, delivery & participation in discussion, and self-evaluation/reflection.<br><br>Feedback will be given during the next class session. |
| | ② | ∟ | |
| | ③ | | |
| | ④ | ∟ | |
| | ⑤ | ∟ | |
| | ⑥ | ∟ | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | ∟ | In-class or assignment handouts for preparation and review of discussion activities (20%)<br><br>Feedback will be given during the next class session. |
| | ② | ∟ | |
| | ③ | | |
| | ④ | | |
| | ⑤ | ∟ | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Professional-level, academic writing and presentations.<br>Discuss 100% in fluent English. | Comprehensible writing and presentations.<br>Discussions mostly in English. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Introduction/Reading I Students will be introduced to the syllabus and contents of the course. Students will participate in brainstorming and background building communication activities. | Brainstorming as a pre-reading technique, individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities. Reading I – Part 1 | 50 |
| 2 / | Quiz Theme I: Ethics & Information (1) Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading I – Part 2 | 50 |
| 3 / | Quiz Theme I: Ethics & Information (2) Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading I – Part 3 | 50 |
| 4 / | Quiz Theme I: Ethics & Information (3) Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading I – Part 4 | 50 |
| 5 / | Quiz Theme I: Ethics & Information (4) Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. | 50 |
| 6 / | Reaction/Response Students will brainstorm ideas and opinions. Students will research related information to support their ideas and learn how to appropriately reference sources to write a reaction/response essay. *Outline Returned* | Individual, pair, and group work; discussion | Review: Complete Reaction/Response Essay Draft 1 | 50 |
| 7 / | Reaction/Response Students will brainstorm ideas and opinions. Students will research related information to support their ideas and learn how to appropriately reference sources to write a reaction/response essay. *Draft 1 Returned* | Individual, pair, and group work; discussion | Review: Complete Reaction/Response Essay Final Draft due Class 9 | 50 |
| 8 / | Reading II Students will participate in brainstorming and background building communication activities. | Individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities. Reading II – Part 1 | 50 |
| 9 / | Quiz Theme: Artificial Intelligence (1) Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading II – Part 2 | 50 |
| 10 / | Quiz Theme: Artificial Intelligence (2) Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading II – Part 3 | 50 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Quiz<br>Theme: Artificial Intelligence (3)<br>Students will review and discuss topics related to the reading or videos.<br>*Reaction/Response Essay Returned* | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading II – Part 4 | 50 |
| 12 / | Quiz<br>Theme: Artificial Intelligence (4)<br>Students will review and discuss topics related to the reading or videos. | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading II – Part 5 | 50 |
| 13 / | Roundtable Discussion/Presentation<br>Students will brainstorm ideas and opinions.<br>Students will research related information to support their ideas and learn how to appropriately reference sources to participate in a roundtable discussion. | Individual, pair, and group work; discussion | Review: Complete Discussion Outline | 50 |
| 14 / | Roundtable Discussion/Presentation<br>Students will present and discuss ideas, opinions, and research related to the topic in a roundtable discussion.<br>Students will complete a written reflection. | Individual, pair, and group work; discussion | Review: Complete written reflection | 50 |
| 15 / | Self-Evaluation<br>Students will be given oral and written feedback both overall and individually on their work.<br>Students will also be encouraged to share their feedback about the course.<br>*Presentation evaluation returned* | Individual, pair, and group work; discussion | | |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S General Required | Comprehensive English IB (a) | 1 | 511200 | Second | Lecture Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | REYNOLDS, Stephanie | Kanazawa C: 31.104 | | TBA |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Critical Thinking<br>2 Communication<br>3 Knowledge<br>4 Writing<br>5 Presentation | In this course, students will be able to improve English communication skills while sharing opinions in group discussions, presentations, and in writing. Students will learn critical thinking skills and content related to the theory of knowledge including ways of knowing. Additionally, students will learn and apply effective and appropriate communication strategies in discussions, presentations, and writing. |

## Course Description and Expectations for Students (10.5pt)

This course will offer discussion, group work, and reflection as types of active learning.
Students will prepare and participate in English discussions using the language skills that are already known.
Students will practice and apply new strategies for effective communication in discussions, presentations, and writing.
Students will write one reaction/response essay and prepare one collaborative, research-based presentation.

It will be important for students to share their own opinions in relation to information from a variety of sources. Therefore, students will learn how to appropriately reference and cite sources.
Students should be prepared with a binder or folder to keep handouts, writing tools for in-class work, and laptop computers for preparing presentations, researching related information, downloading class materials, and submitting online assignments.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks: None (Handouts)
Reference books: Van de Lagemaat, Richard. (2015). Theory of Knowledge for the IB Diploma, 2nd Ed. Cambridge.
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Intermediate English ability
Basic computer skills

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | d | Students will be able to share opinions and ideas through discussions in English. |
| ② | h | Students will be able to think critically about various topics related to ways of knowing. |
| ③ | g | Students will be able to write a reaction/response essay. |
| ④ | c | Students will be able to make presentations in English. |
| ⑤ | c | Students will be able to apply effective communication strategies in presentations and writing. |
| ⑥ | b | Students will be able to reference and cite sources appropriately. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 20 | 30 | 30 | 0 | 20 | 0 | 100 |
| Comprehensive Strength Criteria — Ability to capture knowledge | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| Ability to think, reason and create | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| Collaboration and leadership | 0 | 0 | 0 | 10 | 0 | 5 | 0 | 15 |
| Announcement / Expression / Communication | 0 | 5 | 10 | 10 | 0 | 0 | 0 | 25 |
| Attitude and motivation for learning | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 10 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | | Vocabulary, skill review, and/or reading/listening comprehension quizzes based on the content of in-class activities and assignments (20%): |
| | ② | ∨ | |
| | ③ | | |
| | ④ | | Feedback will be given in the next class session. |
| | ⑤ | ∨ | |
| | ⑥ | | |
| Reports | ① | | One reaction/response essay (30%) |
| | ② | ∨ | Essay includes an outline, first draft, 2 writing conferences, and final draft. |
| | ③ | ∨ | |
| | ④ | | Feedback will be given in the next class session. |
| | ⑤ | ∨ | |
| | ⑥ | ∨ | |
| Presentations | ① | | One jigsaw presentation project (30%) |
| | ② | ∨ | Project includes an outline, delivery of presentation, preparation of supplementary materials, and self-evaluation/reflection. |
| | ③ | | |
| | ④ | ∨ | |
| | ⑤ | ∨ | Feedback will be given in the next class session. |
| | ⑥ | ∨ | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | ∨ | |
| | ② | ∨ | In-class or assignment handouts for preparation and review of discussion activities (20%) |
| | ③ | | |
| | ④ | | Feedback will be given in the next class session. |
| | ⑤ | ∨ | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Professional-level, academic writing and presentations. Discuss 100% in fluent English. | Comprehensible writing and presentations. Discussions mostly in English. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Introduction Students will be introduced to the syllabus and contents of the course. Students will participate in brainstorming and background building communication activities. | Brainstorming as a pre-reading technique, individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 2 / | Students will review and discuss topics related to the theme. Theme: Knowers and Knowing (1) Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 3 / | Students will review and discuss topics related to the theme. Theme: Knowers and Knowing (2) Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 4 / | Students will review and discuss topics related to the theme. Theme: Knowers and Knowing (3) Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 5 / | Students will review and discuss topics related to the theme. Theme: Knowers and Knowing (4) Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 6 / | Students will review, discuss, and brainstorm ideas and opinions. Students will research related information to support their ideas. Theme: Knowers and Knowing (5) Quiz | Individual, pair, and group work; discussion | Review: Complete outline and Reaction/Response Essay Draft 1 | 50 |
| 7 / | Students will brainstorm ideas and opinions. Students will research and learn how to appropriately reference sources to write a reaction/response essay. | Individual, pair, and group work; discussion | Review: Complete Reaction/Response Essay Final Draft due Class 9 | 50 |
| 8 / | Students will participate in writing conferences. Students will create teams, choose topics, and participate in brainstorming and background building communication activities. | Individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 9 / | Students will research information related to their topic and learn how to appropriately reference sources for a presentation. Theme: Ways of Knowing | Individual, pair, and group work; discussion | Review: Start presentation outline | 50 |
| 10 / | Students will continue to research and organize presentation contents. Theme: Ways of Knowing | Individual, pair, and group work; discussion | Review: Complete presentation outline | 50 |

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Students will prepare presentation slides and supplementary materials for their presentation. Theme: Ways of Knowing *Reaction/Response Essay Returned* | Individual, pair, and group work; discussion | Review: Complete presentation slides and supplemental materials Reading – Various articles, book/web resources | 50 |
| 12 / | Jigsaw Presentation/Discussion Theme: Language, Sense Perception, Reason Students will deliver presentations and lead discussions/activities based on supplemental materials connected to their topic of research. Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 13 / | Jigsaw Presentation/Discussion Theme: Emotions, Intuition, Imagination Students will deliver presentations and lead discussions/activities based on supplemental materials connected to their topic of research. Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 14 / | Jigsaw Presentation/Discussion Theme: Memory, Faith Students will deliver presentations and lead discussions/activities based on supplemental materials connected to their topic of research. Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Review: Complete written reflection | 50 |
| 15 / | Self-Evaluation Students will be given oral and written feedback both overall and individually on their work. Students will also be encouraged to share their feedback about the course. *Presentation/Discussion Project Returned* | Individual, pair, and group work; discussion | | |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S General Required | Comprehensive English IB (b) | 1 | 511200 | Second | Lecture Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | REYNOLDS, Stephanie | Kanazawa C: 31.104 | | TBA |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Critical Thinking<br>2 Communication<br>3 Knowledge<br>4 Writing<br>5 Presentation | In this course, students will be able to improve English communication skills while sharing opinions in group discussions, presentations, and in writing. Students will learn critical thinking skills and content related to the theory of knowledge including ways of knowing. Additionally, students will learn and apply effective and appropriate communication strategies in discussions, presentations, and writing. |

## Course Description and Expectations for Students (10.5pt)

This course will offer discussion, group work, and reflection as types of active learning.
Students will prepare and participate in English discussions using the language skills that are already known.
Students will practice and apply new strategies for effective communication in discussions, presentations, and writing.
Students will write one reaction/response essay and prepare one collaborative, research-based presentation.

It will be important for students to share their own opinions in relation to information from a variety of sources. Therefore, students will learn how to appropriately reference and cite sources.
Students should be prepared with a binder or folder to keep handouts, writing tools for in-class work, and laptop computers for preparing presentations, researching related information, downloading class materials, and submitting online assignments.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks: None (Handouts)
Reference books: Van de Lagemaat, Richard. (2015). Theory of Knowledge for the IB Diploma, 2nd Ed. Cambridge.
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Intermediate English ability
Basic computer skills

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | d | Students will be able to share opinions and ideas through discussions in English. |
| ② | h | Students will be able to think critically about various topics related to ways of knowing. |
| ③ | g | Students will be able to write a reaction/response essay. |
| ④ | c | Students will be able to make presentations in English. |
| ⑤ | c | Students will be able to apply effective communication strategies in presentations and writing. |
| ⑥ | b | Students will be able to reference and cite sources appropriately. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 20 | 30 | 30 | 0 | 20 | 0 | 100 |
| Ability to capture knowledge | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| Ability to think, reason and create | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| Collaboration and leadership | 0 | 0 | 0 | 10 | 0 | 5 | 0 | 15 |
| Announcement / Expression / Communication | 0 | 5 | 10 | 10 | 0 | 0 | 0 | 25 |
| Attitude and motivation for learning | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 10 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | | Vocabulary, skill review, and/or reading/listening comprehension quizzes based on the content of in-class activities and assignments (20%): |
| | ② | ∨ | |
| | ③ | | |
| | ④ | | Feedback will be given in the next class session. |
| | ⑤ | ∨ | |
| | ⑥ | | |
| Reports | ① | | One reaction/response essay (30%) |
| | ② | ∨ | Essay includes an outline, first draft, 2 writing conferences, and final draft. |
| | ③ | ∨ | |
| | ④ | | Feedback will be given in the next class session. |
| | ⑤ | ∨ | |
| | ⑥ | ∨ | |
| Presentations | ① | | One jigsaw presentation project (30%) |
| | ② | ∨ | Project includes an outline, delivery of presentation, preparation of supplementary materials, and self-evaluation/reflection. |
| | ③ | | |
| | ④ | ∨ | |
| | ⑤ | ∨ | Feedback will be given in the next class session. |
| | ⑥ | ∨ | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | ∨ | |
| | ② | ∨ | In-class or assignment handouts for preparation and review of discussion activities (20%) |
| | ③ | | |
| | ④ | | Feedback will be given in the next class session. |
| | ⑤ | ∨ | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Professional-level, academic writing and presentations. Discuss 100% in fluent English. | Comprehensible writing and presentations. Discussions mostly in English. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Introduction Students will be introduced to the syllabus and contents of the course. Students will participate in brainstorming and background building communication activities. | Brainstorming as a pre-reading technique, individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 2 / | Students will review and discuss topics related to the theme. Theme: Knowers and Knowing (1) Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 3 / | Students will review and discuss topics related to the theme. Theme: Knowers and Knowing (2) Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 4 / | Students will review and discuss topics related to the theme. Theme: Knowers and Knowing (3) Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 5 / | Students will review and discuss topics related to the theme. Theme: Knowers and Knowing (4) Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 6 / | Students will review, discuss, and brainstorm ideas and opinions. Students will research related information to support their ideas. Theme: Knowers and Knowing (5) Quiz | Individual, pair, and group work; discussion | Review: Complete outline and Reaction/Response Essay Draft 1 | 50 |
| 7 / | Students will brainstorm ideas and opinions. Students will research and learn how to appropriately reference sources to write a reaction/response essay. | Individual, pair, and group work; discussion | Review: Complete Reaction/Response Essay Final Draft due Class 9 | 50 |
| 8 / | Students will participate in writing conferences. Students will create teams, choose topics, and participate in brainstorming and background building communication activities. | Individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 9 / | Students will research information related to their topic and learn how to appropriately reference sources for a presentation. Theme: Ways of Knowing | Individual, pair, and group work; discussion | Review: Start presentation outline | 50 |
| 10 / | Students will continue to research and organize presentation contents. Theme: Ways of Knowing | Individual, pair, and group work; discussion | Review: Complete presentation outline | 50 |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Students will prepare presentation slides and supplementary materials for their presentation. Theme: Ways of Knowing *Reaction/Response Essay Returned* | Individual, pair, and group work; discussion | Review: Complete presentation slides and supplemental materials Reading – Various articles, book/web resources | 50 |
| 12 / | Jigsaw Presentation/Discussion Theme: Language, Sense Perception, Reason Students will deliver presentations and lead discussions/activities based on supplemental materials connected to their topic of research. Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 13 / | Jigsaw Presentation/Discussion Theme: Emotions, Intuition, Imagination Students will deliver presentations and lead discussions/activities based on supplemental materials connected to their topic of research. Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 14 / | Jigsaw Presentation/Discussion Theme: Memory, Faith Students will deliver presentations and lead discussions/activities based on supplemental materials connected to their topic of research. Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Review: Complete written reflection | 50 |
| 15 / | Self-Evaluation Students will be given oral and written feedback both overall and individually on their work. Students will also be encouraged to share their feedback about the course. *Presentation/Discussion Project Returned* | Individual, pair, and group work; discussion | | |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S General Required | Comprehensive English IB (c) | 1 | 511200 | Second | Lecture Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | UTSUNOMIYA, Takako | Kanazawa C: 31.104 | | TBA |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Critical Thinking<br>2 Communication<br>3 Knowledge<br>4 Writing<br>5 Presentation | In this course, students will be able to improve English communication skills while sharing opinions in group discussions, presentations, and in writing. Students will learn critical thinking skills and content related to the theory of knowledge including ways of knowing. Additionally, students will learn and apply effective and appropriate communication strategies in discussions, presentations, and writing. |

### Course Description and Expectations for Students (10.5pt)

This course will offer discussion, group work, and reflection as types of active learning.
Students will prepare and participate in English discussions using the language skills that are already known.
Students will practice and apply new strategies for effective communication in discussions, presentations, and writing.
Students will write one reaction/response essay and prepare one collaborative, research-based presentation.

It will be important for students to share their own opinions in relation to information from a variety of sources. Therefore, students will learn how to appropriately reference and cite sources.
Students should be prepared with a binder or folder to keep handouts, writing tools for in-class work, and laptop computers for preparing presentations, researching related information, downloading class materials, and submitting online assignments.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks: None (Handouts)
Reference books: Van de Lagemaat, Richard. (2015). Theory of Knowledge for the IB Diploma, 2nd Ed. Cambridge.
Reserved books:

### Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Intermediate English ability
Basic computer skills

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | d | Students will be able to share opinions and ideas through discussions in English. |
| ② | h | Students will be able to think critically about various topics related to ways of knowing. |
| ③ | g | Students will be able to write a reaction/response essay. |
| ④ | c | Students will be able to make presentations in English. |
| ⑤ | c | Students will be able to apply effective communication strategies in presentations and writing. |
| ⑥ | b | Students will be able to reference and cite sources appropriately. |

### Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 20 | 30 | 30 | 0 | 20 | 0 | 100 |
| Ability to capture knowledge | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| Ability to think, reason and create | 0 | 5 | 10 | 5 | 0 | 5 | 0 | 25 |
| Collaboration and leadership | 0 | 0 | 0 | 10 | 0 | 5 | 0 | 15 |
| Announcement / Expression / Communication | 0 | 5 | 10 | 10 | 0 | 0 | 0 | 25 |
| Attitude and motivation for learning | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 10 |

(Comprehensive Strength Criteria)

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | | Vocabulary, skill review, and/or reading/listening comprehension quizzes based on the content of in-class activities and assignments (20%): |
| | ② | ✓ | |
| | ③ | | |
| | ④ | | Feedback will be given in the next class session. |
| | ⑤ | ✓ | |
| | ⑥ | | |
| Reports | ① | | One reaction/response essay (30%) Essay includes an outline, first draft, 2 writing conferences, and final draft. |
| | ② | ✓ | |
| | ③ | ✓ | Feedback will be given in the next class session. |
| | ④ | | |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |
| Presentations | ① | | One jigsaw presentation project (30%) Project includes an outline, delivery of presentation, preparation of supplementary materials, and self-evaluation/reflection. |
| | ② | ✓ | |
| | ③ | | |
| | ④ | ✓ | Feedback will be given in the next class session. |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | ✓ | In-class or assignment handouts for preparation and review of discussion activities (20%) |
| | ② | ✓ | |
| | ③ | | |
| | ④ | | Feedback will be given in the next class session. |
| | ⑤ | ✓ | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Professional-level, academic writing and presentations. Discuss 100% in fluent English. | Comprehensible writing and presentations. Discussions mostly in English. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Introduction<br>Students will be introduced to the syllabus and contents of the course. Students will participate in brainstorming and background building communication activities. | Brainstorming as a pre-reading technique, individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities.<br>Reading – Various articles, book/web resources | 50 |
| 2 / | Students will review and discuss topics related to the theme.<br>Theme: Knowers and Knowing (1)<br>Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading – Various articles, book/web resources | 50 |
| 3 / | Students will review and discuss topics related to the theme.<br>Theme: Knowers and Knowing (2)<br>Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading – Various articles, book/web resources | 50 |
| 4 / | Students will review and discuss topics related to the theme.<br>Theme: Knowers and Knowing (3)<br>Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading – Various articles, book/web resources | 50 |
| 5 / | Students will review and discuss topics related to the theme.<br>Theme: Knowers and Knowing (4)<br>Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz<br>Review: Complete the worksheet based on the class activities.<br>Reading – Various articles, book/web resources | 50 |
| 6 / | Students will review, discuss, and brainstorm ideas and opinions. Students will research related information to support their ideas.<br>Theme: Knowers and Knowing (5)<br>Quiz | Individual, pair, and group work; discussion | Review: Complete outline and Reaction/Response Essay Draft 1 | 50 |
| 7 / | Students will brainstorm ideas and opinions. Students will research and learn how to appropriately reference sources to write a reaction/response essay. | Individual, pair, and group work; discussion | Review: Complete Reaction/Response Essay Final Draft due Class 9 | 50 |
| 8 / | Students will participate in writing conferences. Students will create teams, choose topics, and participate in brainstorming and background building communication activities. | Individual, pair, and group work; discussion | Review: Complete the worksheet based on the class activities.<br>Reading – Various articles, book/web resources | 50 |
| 9 / | Students will research information related to their topic and learn how to appropriately reference sources for a presentation.<br>Theme: Ways of Knowing | Individual, pair, and group work; discussion | Review: Start presentation outline | 50 |
| 10 / | Students will continue to research and organize presentation contents.<br>Theme: Ways of Knowing | Individual, pair, and group work; discussion | Review: Complete presentation outline | 50 |

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Students will prepare presentation slides and supplementary materials for their presentation. Theme: Ways of Knowing *Reaction/Response Essay Returned* | Individual, pair, and group work; discussion | Review: Complete presentation slides and supplemental materials Reading – Various articles, book/web resources | 50 |
| 12 / | Jigsaw Presentation/Discussion Theme: Language, Sense Perception, Reason Students will deliver presentations and lead discussions/activities based on supplemental materials connected to their topic of research. Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 13 / | Jigsaw Presentation/Discussion Theme: Emotions, Intuition, Imagination Students will deliver presentations and lead discussions/activities based on supplemental materials connected to their topic of research. Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading – Various articles, book/web resources | 50 |
| 14 / | Jigsaw Presentation/Discussion Theme: Memory, Faith Students will deliver presentations and lead discussions/activities based on supplemental materials connected to their topic of research. Quiz | Individual, pair, and group work; discussion | Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Review: Complete written reflection | 50 |
| 15 / | Self-Evaluation Students will be given oral and written feedback both overall and individually on their work. Students will also be encouraged to share their feedback about the course. *Presentation/Discussion Project Returned* | Individual, pair, and group work; discussion | | |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S General Required | Health and Physical Education IIIA | 1 | 511500 | First | Experiment/Practice Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | TAKIMOTO, Akihiro / CADZOW, Philip | Kanazawa Campus 31-104 | | Tuesday 16:30-17:30 |

## Course Objectives

| Keywords | Learning Objectives |
|---|---|
| 1 Life-long sports<br>2 Safety<br>3 Understanding rules<br>4 Pleasure of sports<br>5 | The student will learn to adopt sports in everyday life to stay healthy<br>The student will develop safety skills to take part in sports in a safe way<br>The student will understand the importance of following rules in sports<br>The student will find their own way to enjoy sports and fitness |

## Course Description and Expectations for Students

This course will offer group discussion and group work in class as a type of active learning.
The sports for this course will be preparation for sports day, softball, and tennis.

Each lesson the Student is expected to:
1. Wear clothes appropriate for playing sports and exercising (this will be check by the instructor and participation may be withheld if the clothing does not meet the requirements).
2. To be aware of safety at all times and to know that there are inherent dangers in playing sports.
3. To undertake this course seriously and to take their health and future livelihood seriously.
4. To try their best to enjoy the sports being played, even if it isn't their preferred sport.
5. To participate in the sports with the intention of improving.

The class will start on time and will warm-up, practice sports drills, then as the student improves at the sport games will be played.

Required Materials
Textbooks:
Reference books: Active Sports 2022
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites)

To be able to receive instructions and information about sports rules, enjoying sports, and health.
The ability to follow rules of softball and tennis after they have been presented to them.

| No. | Program Objectives | Target Abilities for Students |
|---|---|---|
| ① | d | Students will be able to understand the concept of lifelong sports |
| ② | d | Students will be able to understand the way to train basic strength |
| ③ | d | Students will be able to understand how to conduct sports in a safe way |
| ④ | e | Students will learn how to play softball and develop their skills in the game |
| ⑤ | e | Students will be able to play tennis and develop their skills in the game |
| ⑥ | | |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 0 | 0 | 50 | 0 | 0 | 50 | 100 |
| Ability to capture knowledge | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ability to think, reason and create | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 25 |
| Collaboration and leadership | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 25 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Attitude and motivation for learning | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 50 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Reports | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Presentations | ① | ✔ | There will be final games of tennis and softball where points will be awarded for how well the student performs. 25points for each sport for a total of 50 points. |
| | ② | | |
| | ③ | | |
| | ④ | ✔ | |
| | ⑤ | ✔ | |
| | ⑥ | | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | ✔ | In demonstration of the values of this class; fitness, future health, discipline, effort, and participation, the student's eagerness, attendance, and attitude will be evaluated. For a total of 50 points. |
| | ② | ✔ | |
| | ③ | ✔ | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement | Description of Standard Achievement |
|---|---|
| The ideal student will be able to understand the concept of life-long sports and apply it by showing a passion for sports and fitness in each class. They will actively monitor their, and others safety in class. They will show enjoyment of sports and bring enthusiasm to each class. The ideal student will comprehend the rules of tennis and softball to the extent that they can play in a fair manner and respect their opponents. | The standard student will be able to show a general understanding of the need for sports but they might not have the passion to be excited for sports. They will be able to participate in all sports in a safe manner. They will be able to participate in all sports required of them and show effort in actively participating. The standard student will understand the rules of both tennis and softball. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content | Method | Assignments (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Introduction Syllabus explanation | Lecture: Lifelong sports and the importance of health. | Review: Lifelong sports lecture | 100 |
| 2 / | Explanation of the rules of Softball, along with explanation of the equipment to be used. Allocation of designated equipment organizers | Lecture: Rules of Softball, Equipment of Softball | Assignment Due: Rules of Softball<br><br>Review: rules of softball lecture | 100 |
| 3 / | Preparation for sports day. Various sports will be practiced | Lecture and Active Learning | Review: Sports for sports day | 100 |
| 4 / | Practice drills for softball. Lecture on the basic techniques used in softball | Lecture and Active Learning | Review: Basic techniques | 100 |
| 5 / | Develop softball skills by practicing drills to improve and then using those skills in practice games. | Lecture and Active Learning | Review: Game performance | 100 |
| 6 / | Develop softball skills by practicing drills to improve and then using those skills in practice games. | Lecture and Active Learning | Review: Game performance | 100 |
| 7 / | Develop softball skills by practicing drills to improve and then using those skills in practice games. | Lecture and Active Learning | Review: Game performance | 100 |
| 8 / | Develop softball skills by practicing drills to improve and then using those skills in practice games. | Lecture and Active Learning | Review: Game performance | 100 |
| 9 / | Develop softball skills by practicing drills to improve and then using those skills in practice games. | Lecture and Active Learning | Review: Game performance | 100 |
| 10 / | Develop softball skills by practicing drills to improve and then using those skills in practice games. | Lecture and Active Learning | Review: Game performance | 100 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content | Method | Assignments (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Lecture on the rules of tennis, and how matches are run. Introduction to the use of tennis racquet and balls. Designation of equipment preparatory persons. | Lecture: Rules of Tennis and how scoring is counted. | Review: tennis rules Assignment Due: tennis rules. | 100 |
| 12 / | Lecture and Demonstration on the fore stroke and back stroke in tennis. Practice of tennis strokes. | Lecture and Active Learning | Review: fore stroke and back stroke. | 100 |
| 13 / | Underhand + overhand serve lecture, Demonstration and practice. | Lecture and Active Learning | Review: Service in tennis | 100 |
| 14 / | Volley practice and demonstration of how a full match is played. | Lecture and Active Learning | Review: volleys in tennis | 100 |
| 15 / | Doubles matches of tennis. | Lecture and Active Learning | Review: doubles game performance | 100 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S General Required | Health and Physical Education IIIB | 1 | 511600 | Second | Experiment/Practice Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | TAKIMOTO, Akihiro / CADZOW, Philip | Hakusanroku C: 101.201 | | Tuesday 16:30~17:30 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Lifelong sports<br>2 Safety<br>3 Following rules<br>4 Pleasure of sports<br>5 | Students will learn to adopt sports in everyday life in order to keep and promote health. Also, they will be able to take part in sports with precautions for safety's sake. They will learn why they need to follow the rules while taking part in sports. At the same time, they will learn the importance to enjoy sports themselves. |

## Course Description and Expectations for Students (10.5pt)

This course will offer group discussion and group work in class as a type of active learning.
Basic living health, Preparations for sports day, Preparations for ball game day, Tennis ,and Badminton.

1. Wear proper sports attire. (the P.E. instructor will check it each time).
2. Since Sports can be dangerous, pay attention to safety.
3. Understand the importance of lifelong sports.
4. Understand the pleasure of sports.

Take part in sports with an application for improvement.

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books: Active sports 2020
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Be instructed in news and information about sports and health.
Examine the rules of tennis, singles, and doubles badminton.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | d | Students will be able to understand lifelong sports |
| ② | d | Students will be able to understand basic strength |
| ③ | d | Students will be able to understand safety of sports |
| ④ | d, e | Students will be able to understand doubles badminton |
| ⑤ | d, e | Students will be able to understand tennis |
| ⑥ | d, e | Students will be able to understand singles badminton |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 0 | 20 | 30 | 0 | 0 | 50 | 100 |
| Comprehensive Strength Criteria — Ability to capture knowledge | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 20 |
| Ability to think, reason and create | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 15 |
| Collaboration and leadership | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 15 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Attitude and motivation for learning | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 50 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Reports | ① | | The student must submit reports about the rules of badminton and tennis. Full points of each report is 10 points. Total points is 20 points. |
| | ② | | |
| | ③ | | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |
| Presentations | ① | | Full points for badminton is 15 points. The point total on the badminton games is 15. The point total for tennis is 15 points. Combined is 30 points. |
| | ② | | |
| | ③ | | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | ✓ | PE will be important for students to understand their health and physical strength, and this class will be an opportunity of experiences in life long sports. Students eagerness, effort, attendance, and attitude will be evaluated. |
| | ② | ✓ | |
| | ③ | ✓ | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| 1) The ideal student will be able to understand lifelong sports enough. | 1) The ideal student will be able to understand lifelong sports generally. |
| 2) The ideal students will be able to understand safety enough | 2) The ideal students will be able to understand safety generally |
| 3) The ideal students will be able to understand the pleasure of sports enough | 3) The ideal students will be able to understand the pleasure of sports generally |
| 4) The ideal students will be able to understand rules of badminton enough | 4) The ideal students will be able to understand the rules of badminton generally |
| 5) The ideal student will be able to understand the rules of tennis enough | 5) The ideal student will be able to understand the rules of tennis generally |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Understand the rules and gameplay of doubles match tennis games | Lecture and demonstration of procedure of class and tennis matches | Report on the rules and components on the doubles match | 100 |
| 2 / | Practice doubles tennis matches | Games | Games | 100 |
| 3 / | Practice doubles tennis matches | Games | Games | 100 |
| 4 / | Practice doubles tennis matches | Games | Games | 100 |
| 5 / | Practice doubles tennis matches | Games | Games | 100 |
| 6 / | Understand the rules and equipment in use for singles badminton. | Lecture on badminton singles gameplay | Report on rules and components of singles badminton. | 100 |
| 7 / | Understand the singles badminton gameplay | Lecture on the singles gameplay | Games | 100 |
| 8 / | Singles badminton matches | Games | Games | 100 |
| 9 / | Singles badminton matches | Games | Games | 100 |
| 10 / | Singles badminton matches | Games | Games | 100 |

\* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No.<br>Date | Class Content (10pt) | Method (10pt) | Assignments (10pt)<br>(Preview and Review) | Time<br>(Minutes) |
|---|---|---|---|---|
| 11<br><br>/ | Singles badminton matches | Games | Games | 100 |
| 12<br><br>/ | Understanding the doubles badminton gameplay and rules | Lecture on doubles badminton | Games | 100 |
| 13<br><br>/ | Doubles badminton matches | Games | Games | 100 |
| 14<br><br>/ | Doubles badminton matches | Games | Games | 100 |
| 15<br><br>/ | Doubles badminton matches | Games | Games | 100 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Required * Practical | Engineering Design IV A | 2 | 520200 | First | Experiment / Practice Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | * HAYASHI, Michihiro / HAN, Justin / MEBUSAYA, Rattiya / SANG-NGENCHAI, Apirak | 31-126-1 | | Friday 16:00-17:00 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Product making<br>2 Implementation<br>3 Operation<br>4 Presentation<br>5 Collaboration | Students will:<br>(1) Learn computer programs, mechanical design, electrical circuit design.<br>(2) Learn how to propose machine products, network services, robot, etc.<br>(3) Learn how to explain product specifications and performance.<br>(4) Learn how to plan product making. |

## Course Description and Expectations for Students (10.5pt)

This course will offer discovery learning, problem-solving learning and group discussion in class as a type of active learning.

This course deals with the process of product making for competitions such as computer programming contests and robot contests and so on.

(1) Understanding the rules of contests
(2) Consideration of the current situation and problems
(3) Determining the methods to solve the problem
(4) Determining the specification of product to solve the problem
(5) Determining the plan for the product making
(6) Explaining the performance of the product

Relationship between this course and business experience

A faculty member who has practical experience in development of automated material handling equipment, for instance, belt-conveyor, vertical lift, sorting system and POS etc.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:

Reference books:

Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

It is convenient to obtain licenses for safety, lathes, milling machines, drilling machines, electronic circuit, woodwork, etc., in technical courses provided by Yumekobo.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | g,h,i | Be able to understand the rule of computer program and robot contests. |
| ② | a,g,h | Be able to propose the method to solve problem. |
| ③ | a,g,h | Be able to determine the specification of product. |
| ④ | c,d,f,g | Be able to plan for making product. |
| ⑤ | c,d,f | Be able to communicate with other members for making product. |
| ⑥ | d,f,g | Be able to explain the product specification and performance. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 0 | 30 | 40 | 0 | 30 | 0 | 100 |
| Ability to capture knowledge | 0 | 0 | 20 | 5 | 0 | 10 | 0 | 35 |
| Ability to think, reason and create | 0 | 0 | 10 | 5 | 0 | 10 | 0 | 25 |
| Collaboration and leadership | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 10 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 20 |
| Attitude and motivation for learning | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |

(Comprehensive Strength Criteria)

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Reports | ① ⌐ | Students will be evaluated in report about the method to solve problems, the specification and performance of making product, the plan for making product and so on. |
| | ② ⌐ | |
| | ③ ⌐ | |
| | ④ ⌐ | |
| | ⑤ | |
| | ⑥ ⌐ | |
| Presentations | ① ⌐ | Students will be evaluated in presentation about making product. This presentation includes poster presentation and slide-show presentation. |
| | ② ⌐ | |
| | ③ ⌐ | |
| | ④ | |
| | ⑤ ⌐ | |
| | ⑥ ⌐ | |
| Works | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Portfolios | ① ⌐ | Students will be evaluated in the evidence of work, for instance, daily and weekly report, discussion notes, idea memos and sketches, meeting record. |
| | ② ⌐ | |
| | ③ ⌐ | |
| | ④ ⌐ | |
| | ⑤ | |
| | ⑥ | |
| Others | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| (1) Understanding and explaining the rule for computer program and robot contest clearly.<br>(2) Consideration and determining the problem to solve clearly.<br>(3) Planning for making product.<br>(4) Presentation and discussion about the product. | (1) Understanding the rule for computer program and robot contest basically.<br>(2) Determining the problem to solve.<br>(3) Planning for making product.<br>(4) Presentation about the product. |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1-2 / | Course introduction | Lecture and Q&A | Confirm the schedule and objectives | 60 |
| 3-4 / | Understanding the rules | Activity Self-check | Making portfolios | 60 |
| 5-6 / | Finding and determining the problem | Activity Self-check | Making portfolios | 60 |
| 7-8 / | Consideration about making product (1) | Activity Self-check | Making portfolios | 60 |
| 9-10 / | Consideration about making product (2) | Activity Self-check | Making portfolios | 60 |
| 11-12 / | Consideration about making product (3) | Activity Self-check | Making portfolios | 60 |
| 13-14 / | Determining the plan for making product | Activity Self-check | Making portfolios | 60 |
| 15-16 / | Mid-term presentation about the project | Activity Self-check | Making portfolios | 60 |
| 17-18 / | Consideration about making product (4) | Activity Self-check | Making portfolios | 60 |
| 19-20 / | Consideration about making product (5) | Activity Self-check | Making portfolios | 60 |

# Course Schedule

\* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 21-22 / | Consideration about making product (6) | Activity Self-check | Making portfolios | 60 |
| 23-24 / | Determining the specification of product | Activity Self-check | Making portfolios | 60 |
| 25-26 / | Presentation about the product (1) | Activity Self-check | Making portfolios | 60 |
| 27-28 / | Presentation about the product (2) | Activity Self-check | Making portfolios | 60 |
| 29-30 / | Review | Activity Self-check | Making portfolios | 60 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Required * Practical | Engineering Design IV B | 2 | 520300 | Second | Experiment / Practice Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | * HAYASHI, Michihiro / HAN, Justin / MEBUSAYA, Rattiya / SANG-NGENCHAI, Apirak | 31-126-1 | | Friday 16:00-17:00 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Product making<br>2 Implementation<br>3 Operation<br>4 Presentation<br>5 Collaboration | Students will:<br>(1) Learn computer programs, mechanical design, electrical circuit design.<br>(2) Learn how to propose machine products, network services, robot, etc.<br>(3) Learn how to explain product specifications and performance.<br>(4) Learn how to plan product making. |

## Course Description and Expectations for Students (10.5pt)

This course will offer discovery learning, problem-solving learning and group discussion in class as a type of active learning.

This course deal with the process of product making for competitions such as computer programming contests and robot contests and so on.

(1) Understanding the rules of contests
(2) Consideration of the current situation and problems
(3) Determining the methods to solve the problem
(4) Determining the specification of product to solve the problem
(5) Determining the plan for the product making
(6) Explaining the performance of the product

Relationship between this course and business experience

A faculty member who has practical experience in development of automated material handling equipment, for instance, belt-conveyor, vertical lift, sorting system and POS etc.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:

Reference books:

Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

It is convenient to obtain licenses for safety, lathes, milling machines, drilling machines, electronic circuit, woodwork, etc., in technical courses provided by Yumekobo.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | g,h,i | Be able to understand the rule of computer program and robot contests. |
| ② | a,g,h | Be able to propose the method to solve problem. |
| ③ | a,g,h | Be able to determine the specification of product. |
| ④ | c,d,f,g | Be able to plan for making product. |
| ⑤ | c,d,f | Be able to communicate with other members for making product. |
| ⑥ | d,f,g | Be able to explain the product specification and performance. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 0 | 0 | 40 | 30 | 30 | 0 | 100 |
| Ability to capture knowledge | 0 | 0 | 0 | 5 | 20 | 10 | 0 | 35 |
| Ability to think, reason and create | 0 | 0 | 0 | 5 | 10 | 10 | 0 | 25 |
| Collaboration and leadership | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 10 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 20 |
| Attitude and motivation for learning | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 10 |

(Comprehensive Strength Criteria)

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Reports | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Presentations | ① ∟ | Students will be evaluated in presentation about making product. This presentation includes poster presentation and slide-show presentation. |
| | ② ∟ | |
| | ③ ∟ | |
| | ④ | |
| | ⑤ ∟ | |
| | ⑥ ∟ | |
| Works | ① ∟ | Students will be evaluated in the product to solve problems. The product includes computer programs, electric circuit, mechanical parts, instruction manuals and so on. |
| | ② ∟ | |
| | ③ ∟ | |
| | ④ ∟ | |
| | ⑤ | |
| | ⑥ ∟ | |
| Portfolios | ① ∟ | Students will be evaluated in the evidence of work, for instance, daily and weekly report, discussion notes, idea memos and sketches, meeting record. |
| | ② ∟ | |
| | ③ ∟ | |
| | ④ ∟ | |
| | ⑤ | |
| | ⑥ | |
| Others | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| (1) Understanding and explaining the rule for computer program and robot contest clearly.<br>(2) Consideration and determining the problem to solve clearly.<br>(3) Planning for making product.<br>(4) Presentation and discussion about the product. | (1) Understanding the rule for computer program and robot contest basically.<br>(2) Determining the problem to solve.<br>(3) Planning for making product.<br>(4) Presentation about the product. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1-2 / | Course introduction | Lecture and Q&A | Confirm the schedule and objectives | 60 |
| 3-4 / | Planning for making product | Activity Self-check | Making portfolios | 60 |
| 5-6 / | Making the product (1) | Activity Self-check | Making portfolios | 60 |
| 7-8 / | Making the product (2) | Activity Self-check | Making portfolios | 60 |
| 9-10 / | Making the product (3) | Activity Self-check | Making portfolios | 60 |
| 11-12 / | Making the product (4) | Activity Self-check | Making portfolios | 60 |
| 13-14 / | Making the product (5) | Activity Self-check | Making portfolios | 60 |
| 15-16 / | Making the product (6) | Activity Self-check | Making portfolios | 60 |
| 17-18 / | Making the product (7) | Activity Self-check | Making portfolios | 60 |
| 19-20 / | Making the product (8) | Activity Self-check | Making portfolios | 60 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 21-22 / | Making the product (9) | Activity Self-check | Making portfolios | 60 |
| 23-24 / | Making the product (10) | Activity Self-check | Making portfolios | 60 |
| 25-26 / | Presentation about the product (1) | Activity Self-check | Making portfolios | 60 |
| 27-28 / | Presentation about the product (2) | Activity Self-check | Making portfolios | 60 |
| 29-30 / | Review | Activity Self-check | Making portfolios | 60 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Elective | Internship I | 1 | 520700 | Intensive | Experimental/Practice Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | HAYASHI, Michihiro | Kanazawa C 31.126 | | |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Career design<br>2 Engineering skills and knowledge<br>3 Skills for research<br>4 Human skills<br>5 | Students will gain experience related to their chosen field of study and possible future career. The students will not only improve their skills and knowledge, but also make connections between learning and practice, which the students may not experience in their regular classes. Also, the students will develop the autonomy, responsibility, and attitude needed for them to become an individual who can make a positive contribution to society. |

## Course Description and Expectations for Students (10.5pt)

Students will work on a project under the direction of their advisors, based on their chosen field of study.

Advice on taking this class
- Be aware that this is an opportunity given to students by the hosting institutions.
- Follow the directions of advisors and submit all assignments on time.
- Work independently and in groups.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic background information of an accepting lab.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | a, h | Students will be able to complete tasks by applying what they have practiced. |
| ② | e, i | Students will be able to understand their strengths and weaknesses better. |
| ③ | b, i | Students will be able to have a deeper understanding of their chosen field of studies. |
| ④ | b, i | Students will be able to develop a better idea of what they would like to pursue in the future. |
| ⑤ | b, i | Students will be able to reflect on what they did and set goals for the future. |
| ⑥ | c, d | Students will be able to develop attitudes and abilities needed to work productively with others. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 0 | 50 | 40 | 0 | 10 | 0 | 100 |
| Ability to capture knowledge | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 15 |
| Ability to think, reason and create | 0 | 0 | 10 | 10 | 0 | 0 | 0 | 20 |
| Collaboration and leadership | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 15 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 30 |
| Attitude and motivation for learning | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 20 |

(Comprehensive Strength Criteria)

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Reports | ① ∨ | This evaluation will be made by the report of the hosting institutions. |
| | ② | |
| | ③ ∨ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Presentations | ① ∨ | This evaluation will be made by the students' presentation at internship presentation session. |
| | ② ∨ | |
| | ③ ∨ | |
| | ④ ∨ | |
| | ⑤ ∨ | |
| | ⑥ ∨ | |
| Works | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Portfolios | ① | This evaluation will be made by the report students write. |
| | ② ∨ | |
| | ③ | |
| | ④ ∨ | |
| | ⑤ ∨ | |
| | ⑥ ∨ | |
| Others | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| (1) Presentation and discussion about experiences in a laboratory. <br> (2) Recording and summarizing research experiences in a notebook clearly. <br> (3) Understanding and explaining how to find problems to solve and how to carry out research clearly. | (1) Presentation about experiences in a laboratory. <br> (2) Recording research experiences in a notebook. <br> (3) Understanding and explaining how to carry out research. |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Lab work | Research | | |
| 2 / | Lab work | Research | | |
| 3 / | Lab work | Research | | |
| 4 / | Lab work | Research | | |
| 5 / | Lab work | Research | | |
| 6 / | Lab work | Research | | |
| 7 / | Lab work | Research | | |
| 8 / | Lab work | Research | | |
| 9 / | Lab work | Research | | |
| 10 / | Lab work | Research | | |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Lab work | Research | | |
| 12 / | Lab work | Research | | |
| 13 / | Preparation for presentation | Making slides | | |
| 14 / | Preparation for presentation | Making slides | | |
| 15 / | Presentation | | | |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Elective * Practical | Entrepreneurship | 1 | 520900 | Second | Lecture Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | * MEBUSAYA, Rattiya / MEBUSAYA, Tossa, | Kanazawa C:31:307 | | Make an appointment in class |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Entrepreneurship<br>2 Innovation<br>3 Value Creation<br>4 Startups<br>5 Business Strategy | In this course, we will try to find a framework when we think about entrepreneurship and explain the innovation and entrepreneurship as a focused and systematic discipline.<br><br>The goal of this course is to capture the ideas that existing businesses and new ventures need to know and do to succeed in today's economy. |

## Course Description and Expectations for Students (10.5pt)

This course provides a hands-on approach to entrepreneurship through problem-solving learning, investigative learning, group discussion, and experiential learning, allowing students to initiate and develop their own business or entrepreneurial ideas as a type of active learning.
Students will analyze real-world business examples and compelling success stories of entrepreneurs, gaining insight into the entrepreneurial mindset and decision-making processes. Through lectures and direct engagement with real entrepreneurs, students will establish practical guidelines for identifying and capitalizing on opportunities and innovative ideas.
Additionally, students are encouraged to actively seek and process information daily, stay aware of market trends, and be responsive to changes in the world, fostering adaptability and innovation.

Relationship between this course and business experiences

Drawing from the instructor's extensive experience in startups and management across various industries, the course integrates case studies, discussions, and insights into key factors for entrepreneurial success. Through interactive learning and exposure to real business challenges, students will develop the skills, mindset, and confidence needed to navigate the entrepreneurial journey effectively.

## Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks: None
Reference books: Innovation and Entrepreneurship, Peter Drucker. Zero To One, Peter Thiel
Reserved books: None

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Students need to have an interest in business development,
and have a certain basic knowledge of marketing and business system.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | a,i,g | Students are able to explain all about "entrepreneur." |
| ② | a,i,g | Students understand and aware of successful stories as well as the reasons of fail and success behind them. |
| ③ | c,g | Students understand the challenges and risks involved in starting a new business |
| ④ | c,g | Students learned and understand about the various type of entrepreneurship, including startup, and are able to selected the right one. |
| ⑤ | d, e, f | Students will be able to provide effective feedback as well as accept criticism from others |
| ⑥ | f, g | Students will utilize their knowledge of entrepreneurship and innovation to develop and communicate their business ideas (at the idea stage) during a business pitch. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 0 | 50 | 30 | 10 | 0 | 10 | 100 |
| Comprehensive Strength Criteria — Ability to capture knowledge | 0 | 0 | 25 | 10 | 0 | 0 | 0 | 35 |
| Comprehensive Strength Criteria — Ability to think, reason and create | 0 | 0 | 25 | 10 | 0 | 0 | 0 | 35 |
| Comprehensive Strength Criteria — Collaboration and leadership | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 10 |
| Comprehensive Strength Criteria — Announcement / Expression / Communication | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 10 |
| Comprehensive Strength Criteria — Attitude and motivation for learning | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 10 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

# Evaluation Method

| Evaluation Method | Target Ability | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Reports | ① ✔ | Write reports of your impressions on the lectures by real entrepreneurs from various industries, and/or write report on your work progress. |
| | ② ✔ | |
| | ③ ✔ | |
| | ④ ✔ | |
| | ⑤ | |
| | ⑥ | |
| Presentations | ① ✔ | Share the results of your own research and evaluation on startup stories. |
| | ② ✔ | |
| | ③ ✔ | |
| | ④ ✔ | |
| | ⑤ ✔ | |
| | ⑥ ✔ | |
| Works | ① ✔ | Group discussion on external lectures. |
| | ② ✔ | |
| | ③ ✔ | |
| | ④ ✔ | |
| | ⑤ ✔ | |
| | ⑥ ✔ | |
| Portfolios | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Others | ① ✔ | Students are evaluated based on their learning attitudes and reporting status. |
| | ② ✔ | |
| | ③ ✔ | |
| | ④ ✔ | |
| | ⑤ | |
| | ⑥ | |

## Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| - Students are able to play the role of an entrepreneur.<br>- Students understand the success stories and the reasons behind for their success.<br>- Students understand the challenges and risks of starting a new business and know how to deal with them.<br>- Students are able to understand the role of innovation and its impact in the entrepreneur and business world. | - Students are able to explain the role of an entrepreneur and initiate their own idea project as an entrepreneur.<br>- Students are able to explained and learned lessons and the reason behind success stories.<br>- Students are aware and understand the challenges and risks involved in starting a new business.<br>- Students understand and be able to implement the innovation role into their idea project. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Guidance<br>All about "Entrepreneur" | Lecture<br>Q&A<br>Discussion | Review class materials / handouts.<br><br>Research & Report #1 | 50 |
| 2 / | Invention, Innovation, Entrepreneurship and Values | Lecture<br>Q&A<br>Discussion | Review class materials / handouts. | 50 |
| 3 / | Lecture and Case study 1: Entrepreneurship success/failure story and lesson learn – Key success matrixes.<br><br>Canvas and pitch deck. | Lecture<br>Q&A<br>Discussion | Review class materials / handouts.<br><br>Research & Report #2 | 50 |
| 4 / | Mindset : Problems and Validation | Lecture<br>Q&A<br>Discussion | Review class materials / handouts.<br><br>Research & Report #3 | 50 |
| 5 / | Stakeholders, Users, Persona, Markets | Lecture<br>Q&A<br>Discussion | Review class materials / handouts. | 50 |
| 6 / | Value Proposition. | Discussion<br>Q&A | Review class materials / handouts. | 50 |
| 7 / | Solutions and Value Proposition.<br><br>Problem solving model, UX/UI, customers journey | Lecture<br>Q&A<br>Discussion | Review class materials / handouts.<br><br>Research & Report #4 | 50 |
| 8 / | Competitors and Unfair-advantages | Lecture<br>Q&A<br>Discussion | Review class materials / handouts.<br><br>Self-reflection #1 | 50 |
| 9 / | Analytic tools – 5 forces, Pastle, SWOT | Discussion<br>Q&A | Review class materials / handouts. | 50 |
| 10 / | Solution design, story board, customer journey, Solution validation | Lecture<br>Q&A<br>Discussion | Review class materials / handouts.<br><br>Research & Report #5 | 50 |

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Users/Customers feedback, validation. Revenue models | Lecture Q&A Discussion | Review class materials / handouts. | 50 |
| 12 / | Investment and funding options, equity, stages | Discussion Q&A | Review class materials / handouts. | 50 |
| 13 / | Pitching script and pitch deck | Lecture Q&A Discussion | Review class materials / handouts. | 50 |
| 14 / | Doing business in AI era. Finalizing project. | Lecture Q&A Discussion | Review class materials / handouts. Pitching script / Pitch deck | 50 |
| 15 / | Final presentation: Present your own entrepreneurial project Class recap | Presentation | Review class materials / handouts. Self-reflection #2 | |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Required | AI Fundamentals | 1 | 521100 | Second | Lecture Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | SANG-NGENCHAI, Apirak | KC 31-125-1 | | Fri. 16.30 - 17.30 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Artificial Intelligence<br>2 Algorithms<br>3 Machine learning,<br>4 Neural networks | AI (Artificial Intelligence) is a fundamental topic in current society. This course introduces a foundation for responding to the new paradigm of science and technology. Students will learn about the basic contents and perform basic operations in AI. Furthermore, students will be able to make elementary data constructions, which are necessary for machine learning. |

## Course Description and Expectations for Students (10.5pt)

This course will offer experiential learning in class as a type of active learning.

This 15-week course introduces students to the exciting world of Artificial Intelligence (AI). Students will explore the evolution of AI over time, its current applications, and what the future may hold. Each week, students will learn a new part of AI, starting with the basics and gradually moving to more advanced topics, including:

- How computers can learn using machine learning
- How AI makes decisions
- Understanding neural networks and how they work
- Learning about AI safety and its impact on society

The course includes hands-on activities, projects, and real-world examples to make learning AI fun and engaging. By the end of the course, students will have developed a strong understanding of AI and its numerous applications in the world today.

### Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Knowledge and experience learned and acquired so far.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | a | Students will be able to analyze issues, collect information, and identify problems. |
| ② | h | Students will be able to think logically based on data, facts, and truth. |
| ③ | h | Students will be able to connect and apply new knowledge and acquired knowledge. |
| ④ | d | Students will be able to explain their analysis and ideas in a logical and easy-to-understand manner. |
| ⑤ | a | Students will be able to demonstrate an attitude of trying to objectively evaluate their abilities. |
| ⑥ | | |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 15 | 40 | 20 | 25 | 0 | 0 | 100 |
| Ability to capture knowledge | 0 | 10 | 20 | 5 | 10 | 0 | 0 | 45 |
| Ability to think, reason and create | 0 | 5 | 20 | 5 | 10 | 0 | 0 | 40 |
| Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 10 |
| Attitude and motivation for learning | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 |

*Comprehensive Strength Criteria (left vertical label for the last five rows)*

\* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① ✓ | There will be a quiz in week 5 / 10 / 14 |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ ✓ | |
| | ⑥ | |
| Reports | ① ✓ | Students are required to submit weekly reports as evidence of their understanding gained in class. The instructors will specify the format of the report. |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ ✓ | |
| | ⑥ | |
| Presentations | ① ✓ | There will be a presentation at the end of the semester. Students will present oral progress reports on their projects. The instructors will announce the format of the presentation, such as slides, posters, and/or any other style. |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ ✓ | |
| | ⑥ | |
| Works | ① ✓ | The work will include individual reports that detail the project's progress and outcomes. Students are required to submit the final project by the end of the semester. |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ ✓ | |
| | ⑥ | |
| Portfolios | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Others | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Gain foundational knowledge of AI, its history, and future directions. Understand the basics and advanced concepts of machine learning. Introduce deep learning concepts and their practical applications. Participate in ethical debates and discussions, developing a responsible perspective towards AI development and usage. | • A solid foundation in critical thinking and problem-solving skills.<br>• The ability to innovate and think creatively in various situations.<br>• Effective communication skills, both in personal and professional contexts. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Class Guidance<br>Lesson 1: Introduction to AI and History | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class. | 60 |
| 2 / | Lesson 2: Machine Learning 1 | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class. | 60 |
| 3 / | Lesson 3: Machine Learning 2 | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class. | 60 |
| 4 / | Lesson 4: Machine Learning 3 | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class. | 60 |
| 5 / | Lesson 5: Neural Networks 1 | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class.<br>Quiz from lesson 1-4 | 60 |
| 6 / | Lesson 6: Neural Networks 2 | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class. | 60 |
| 7 / | Lesson 7: Deep Learning 1 | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class. | 60 |
| 8 / | Lesson 8: Deep Learning 2 | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class. | 60 |
| 9 / | Lesson 9: Deep Learning 3 | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class. | 60 |
| 10 / | Lesson 10: Computer Vision | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class.<br>Quiz from lesson 5-9 | 60 |
| 11 / | Lesson 11: Natural Language Processing (NLP) | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class. | 60 |

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 12 / | Lesson 12: AI and Creative Fields 1 | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class. | 60 |
| 13 / | Lesson 13: AI and Creative Fields 2 | Lecture / Activity / Explanation / Report | The teacher will announce the assignments in class. | 60 |
| 14 / | Lesson 14: AI Ethics and Responsible AI. | Lecture / Activity / Explanation / Report | Prepare for the presentation and the report. Quiz from lesson 10 - 14 | 60 |
| 15 / | Lesson 15: Course Review and AI Project Showcase | Activity / Presentation | Presentation | 60 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Required | Integrated Math and Sci. for Engineering I | 4 | 521800 | First | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | YAMAOKA, Hidetaka | Kanazawa C:23.502 | | Make an appointment in class |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Limit and Continuity<br>2 Differentiation and its Applications<br>3 Definite and indefinite integrals<br>4 Elementary Functions<br>5 Function Expressing Motion | Students will learn:<br>(1) differentiation and its applications.<br>(2) definite and indefinite integrals.<br>(3) exponential functions, logarithmic functions, trigonometric functions, and inverse trigonometric functions.<br>(4) functions expressing the motion of an object. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.

This is a basic course in integrated mathematics and science for engineering. We will cover the following topics:
 1. Functions, their graphs, displacement of graphs, and the limit value and continuity of functions.
 2. Differentiation of various functions, and applications of differentiation.
 3. Definite and indefinite integrals
 4. Expressions of the motion of an object, and their velocity and acceleration.

Extra classes may be held depending the comprehension level of students.

Students are required to review and preview each class. As a matter of particular emphasis, students are required to attempt the exercises after each class.

Extra materials may be distributed if necessary.

Students are required to show their solution/calculation procedure logically and clearly in each assignment.

Students are expected to utilize the Math. and Science Education Research Center or the office hours of the teacher.

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Calculus Volume 1, 2, 3 (OpenStax) https://openstax.org/details/books/calculus-volume-1,
  https://openstax.org/details/books/calculus-volume-2, https://openstax.org/details/books/calculus-volume-3
Reference books: Integrated Math and Science for Engineer (KIT Text)

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic calculation skills of numerical formulas (expansion, factorization, division, and calculation of fractional formula).

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | h | Understand the theory, limits, and continuity of functions and draw graphs of functions. |
| ② | h | Understand the theory of power series expansion and evaluate the integrals of various functions. |
| ③ | h | Become proficient with exponential functions and logarithmic functions |
| ④ | h | Become proficient with trigonometric functions and inverse trigonometric functions. |
| ⑤ | i | Understand the meanings of fundamental English words for mathematics. |
| ⑥ | i | Be able to demonstrate an understanding of all topics, attend every class, and do the required work. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 64 | 16 | 0 | 0 | 0 | 20 | 100 |
| Comprehensive Strength Criteria — Ability to capture knowledge | 0 | 20 | 0 | 0 | 0 | 0 | 5 | 25 |
| Ability to think, reason and create | 0 | 12 | 8 | 0 | 0 | 0 | 5 | 25 |
| Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Announcement / Expression / Communication | 0 | 16 | 4 | 0 | 0 | 0 | 5 | 25 |
| Attitude and motivation for learning | 0 | 16 | 4 | 0 | 0 | 0 | 5 | 25 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

## Evaluation Method

| Evaluation Method | Target Ability | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① ✓ | Quiz 1 will focus on target abilities ①and ⑤.Quiz 2 will focus on target abilities ②and ⑤.In the intermediate quiz, students will be evaluated on target abilities ①, ②, and ⑤. Quiz 3 will focus on target abilities ③and ⑤.Quiz 4 will focus on target abilities ④and ⑤.In the final quiz, students will be evaluated on target abilities from ③to ⑤.The quizzes 1-4 will comprise 6% of the overall evaluation (for a total of 24%) and the intermediate and final quizzes will comprise 20% of the overall evaluation (for a total of 40%). |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ ✓ | |
| | ⑥ | |
| Reports | ① ✓ | Students will be evaluated on the integrated subject (16%). Students are expected to display logical thinking in their report. Students are required to show their solution/calculation procedure logically and are not allowed to copy from others. The subject and the report deadline will be announced by the teacher. |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ ✓ | |
| | ⑥ ✓ | |
| Presentations | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Works | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Portfolios | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Others | ① | Students will be evaluated on homework, exercises, preparation, and review, which together will comprise 20% of the overall evaluation. Attendance and attitude in class are included in this category. Students are expected to utilize the Math. and Science Education Research Center or the office hours of the teacher if they have any questions. |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ ✓ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| (1) Accurately draw graphs of basic functions. (2) Accurately explain the limit and continuity of a function. (3) Accurately calculate exponential, logarithmic, trigonometric, and inverse trigonometric functions. (4) Fully understand the theory of differentiation. (5) Accurately calculate power series expansion and evaluate the integrals of various functions. (6) Accurately explain the motion of an object using the appropriate function. (7) Demonstrate an understanding of all topics and complete all homework. | (1) Draw graphs of basic functions. (2) Explain the limit and continuity of a function. (3) Calculate exponential, logarithmic, trigonometric, and inverse trigonometric functions. (4) Understand the theory of differentiation. (5) Calculate power series expansion and evaluate the integrals of various functions. (6) Explain the motion of an object using an appropriate function. (7) Demonstrate an understanding of all topics and complete all homework. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Course introduction<br>Functions | Instruction<br>Lecture and exercise | Understand the objectives of the class<br>Rev.: Definition of function<br>Prev.: Graph of a function | 30<br><br>100<br>70 |
| 2 / | Graph of a function<br>Polynomial functions and Power functions | Lecture and exercise | Self-study: Elementary functions<br>Rev.: Odd and even functions<br>Prev.: Translation of graph | 50<br><br>100<br><br>50 |
| 3 / | Displacement of a graph<br>Inverse functions | Lecture and exercise | Self-study: Graph of an inverse function<br>Rev.: Inverse functions<br>Prev.: Limit value of a function | 50<br><br>100<br>50 |
| 4 / | Limit value of a function<br>Continuity of a function | Lecture and exercise | Self-study: Gauss symbol<br>Rev.: Limit value of a function<br>Prev.: Shape of graph | 50<br>100<br><br>50 |
| 5 / | Differential coefficients and Derivatives<br>Characteristics of derivative functions | Lecture and exercise | Self-study: Derivative functions<br>Rev.: Tangent and normal lines<br>Prev.: Derivatives | 50<br><br>100<br><br>50 |
| 6 / | Increase and decrease of functions | Lecture and exercise | Self-study: Increase and decrease<br>Rev.: First and second derivative tests<br>Prev.: Quiz 1 | 50<br><br>50<br><br>100 |
| 7 / | Quiz 1<br>Higher order derivatives and their application | Quiz<br>Lecture and exercise | Self-study: Higher order derivatives<br>Rev.: Quiz 1<br>Prev.: l'Hospital's theorem | 50<br><br>100<br>50 |
| 8 / | Taylor's theorem and Maclaurin's expansion | Lecture and exercise<br>Return quiz results<br>Self-check | Self-study: Taylor's expansion<br>Rev.: Mean value theorem<br>Prev.: Maclaurin's expansion<br>Self-check: Self-reflection | 50<br><br>90<br><br>40<br>20 |
| 9 / | Power series expansions of various functions<br>n-th order approximation of function | Lecture and exercise | Self-study: Approximation<br>Rev.: Power series expansion<br>Prev.: Sequences and sigma (summation) notation | 50<br><br>100<br>50 |
| 10 / | Riemann sums | Lecture and exercise | Self-study: Sigma (summation) formula<br>Rev.: Riemann sums<br>Prev.: Primitive functions | 50<br><br>100<br>50 |

\* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Definite integrals Fundamental theorem of calculus | Lecture and exercise | Self-study: Various indefinite integrals | 50 |
| | | | Rev.: Exercises on integration | 100 |
| | | | Prev.: Integration by parts | 50 |
| 12 / | Review of integrals I Integration by parts | Lecture and exercise | Self-study: Indefinite integrals | 50 |
| | | | Rev.: Wallis formula | 50 |
| | | | Prev.: Quiz 2 | 100 |
| 13 / | Quiz 2 Displacement, velocity, and acceleration | Quiz Lecture and exercise | Self-study: Velocity and acceleration | 50 |
| | | | Rev.: Quiz 2 | 100 |
| | | | Prev.: Law of motion | 50 |
| 14 / | Function expressing of motion [Integrated subject] | Lecture and exercise Return quiz results Self-check | Exercises of integrated subject | 120 |
| | | | Prev.: Class contents of #1-#12 | 60 |
| | | | Self-check: Self-reflection | 20 |
| 15 / | Review of first half | Exercises for #1-#12 | Review: Class contents of #1-#12 | 200 |
| 16 / | Intermediate quiz Derivatives of composite functions Derivatives of inverse functions | Intermediate quiz Lecture and exercise | Self-study: Composite func. | 50 |
| | | | Rev.: Intermediate quiz, Confirmation of submission, attendance | 100 |
| | | | Prev.: Derivatives of composite functions | 50 |
| 17 / | Review of intermediate quiz Review of integrals II Integration by substitution | Return intermediate quiz results and reports on integrated subject Self-check of first half Lecture and exercise | Self-study: Integration by substitution | 50 |
| | | | Rev.: Improper integrals | 80 |
| | | | Prev.: Napier's constants | 50 |
| | | | Self-check: Int.med. quiz | 20 |
| 18 / | Derivatives of exponential and logarithmic functions | Lecture and exercise | Self-study: Logarithmic equations and Inequalities | 50 |
| | | | Rev.: Natural logarithm | 100 |
| | | | Prev.: Common logarithm | 50 |
| 19 / | Semi-logarithmic graph Logarithmic differentiation | Lecture and exercise | Self-study: Logarithmic law | 50 |
| | | | Rev.: Semi-logarithmic graph | 100 |
| | | | Prev.: Logarithmic differentiation | 50 |
| 20 / | Hyperbolic functions | Lecture and exercise | Self-study: Hyperbolic functions | 50 |
| | | | Rev.: Inverse hyperbolic functions | 100 |
| | | | Prev.: Derivatives of hyperbolic functions | 50 |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 21 / | Conic curves<br>Implicit Differentiation | Lecture and exercise | Self-study: Conic curves<br>Rev.: Differentiation of implicit functions<br>Prev.: Quiz 3 | 50<br>50<br><br>100 |
| 22 / | Quiz 3<br>Trigonometric functions<br>Inverse trigonometric functions | Quiz<br>Lecture and exercise | Self-study: Radian method, a trigonometric function<br>Rev.: Quiz 3<br>Prev.: Graph of an inverse trigonometric function | 50<br><br>100<br>50 |
| 23 / | Derivatives of trigonometric functions and inverse trigonometric functions | Lecture and exercise<br>Return quiz results<br>Self-check | Self-study: An inverse trigonometric function<br>Rev.: Def. of an inverse trigonometric function<br>Prev.: Integrals involving quadratics<br>Self-check: Self-reflection | 50<br><br>80<br><br>50<br>20 |
| 24 / | Integrals Involving Quadratics | Lecture and exercise | Self-study: Decomposition of rational<br>Rev.: Integrals involving quadratics<br>Prev.: Relationships among trigonometric functions | 50<br><br>100<br><br>50 |
| 25 / | Trigonometric addition formula<br>Euler's formula | Lecture and exercise | Self-study: Trigonometric identities<br>Rev.: Trigonometric addition formula<br>Prev.: Quiz 4 | 50<br><br>100<br><br>50 |
| 26 / | Quiz 4<br>r-alpha method of trigonometric functions | Quiz<br>Lecture and exercise | Self-study: r-alpha method of trigonometric functions<br>Rev.: Quiz 4<br>Prev.: Class contents of #16-#26 | 50<br><br>100<br>50 |
| 27 / | Review of second half | Exercises of #16-#26<br>Return quiz results<br>Self-check | Rev.: Class contents of #16-#26<br>Self-check: Self-reflection | 180<br><br>20 |
| 28 / | Final quiz<br>Velocity and acceleration of various motion [Integrated subject] | Final quiz<br>Lecture and exercise | Rev.: Motion of the objects that gravity acts<br>Prev.: Simple harmonic motion | 150<br><br>50 |
| 29 / | Velocity and acceleration of various motion [Integrated subject] | Lecture and exercise | Rev.: Integrated subject<br>Self-check: Confirmation of submission, attendance | 150<br><br>50 |
| 30 / | Review of final quiz<br>Self-check | Review of final quiz<br>Return final quiz results and reports on integrated subject<br>Self-check<br>Questionnaire | Rev.: Final quiz<br>Self-check: Self-reflection | 100<br>100 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Required | Integrated Math and Sci. for Engineering II | 4 | 521900 | Second | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | TANAKA, Yasuhiro / EVANS, Davis | Kanazawa C: 23.502 | | Make an appointment in class |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Newton's laws of motion<br>2 Differential equations<br>3 Line integrals and works<br>4 Center of gravity<br>5 Moments of inertia | Students will be able to:<br>(1) learn how to describe various motions using Newton's laws of motion.<br>(2) learn equations of motion as an application of integrals.<br>(3) learn line integrals and works.<br>(4) learn moments of force, center of gravity, and moments of inertia. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.

This is a basic course in integrated mathematics and science for engineering. We will cover the following topics:
1. Displacement, velocity, acceleration, Newton's laws of motion, and description of various motions.
2. 1st-order differential equations, 2nd-order linear differential equations, equations of motion and mechanics.
3. Line integrals and works.
4. Areas between two curves, multiple integrals, volume of a solid, center of gravity, and moments of inertia.

Students are required to review and preview each class.
Extra materials may be distributed if necessary.
Students are required to show their procedure for solution/calculation logically and clearly in each assignment.
Students are expected to utilize the Math. and Science Education Research Center or the office hours of the instructors.

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Calculus Volume 1, 2, 3 (OpenStax) (license: CC BY-NC-SA) https://openstax.org/details/books/calculus-volume-1, https://openstax.org/details/books/calculus-volume-2, https://openstax.org/details/books/calculus-volume-3

Reference books: Integrated Math and Science for Engineering II, Integrated Math and Science for Engineering I

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Skills and knowledge from the Integrated Mathematics and Science for Engineering I.
Knowledge of exponential functions, logarithmic functions, and trigonometric functions.
Basic calculation skills for differentiation and integration.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | h | Describe equations of motion for simple motions of an object using Newton's laws of motion. |
| ② | h | Solve separable, 1st-order linear and 2nd-order, linear, homogeneous differential equations. |
| ③ | h | Understand the concept of line integrals and find the works. |
| ④ | h | Evaluate the areas between two curves, the volumes of a solid, moments of inertia, and the center of gravity for a solid. |
| ⑤ | i | Understand the meanings of fundamental English words for mathematics. |
| ⑥ | i | Be able to demonstrate an understanding of all topics, attend every class, and do the required works. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 64 | 16 | 0 | 0 | 0 | 20 | 100 |
| Comprehensive Strength Criteria — Ability to capture knowledge | 0 | 20 | 0 | 0 | 0 | 0 | 5 | 25 |
| Comprehensive Strength Criteria — Ability to think, reason and create | 0 | 12 | 8 | 0 | 0 | 0 | 5 | 25 |
| Comprehensive Strength Criteria — Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Comprehensive Strength Criteria — Announcement / Expression / Communication | 0 | 16 | 4 | 0 | 0 | 0 | 5 | 25 |
| Comprehensive Strength Criteria — Attitude and motivation for learning | 0 | 16 | 4 | 0 | 0 | 0 | 5 | 25 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① ∟ | Quiz 1 will focus on target ability ①. Quiz 2 will focus on target ability ②. |
| | ② ∟ | In the intermediate quiz, students will be evaluated on target abilities ① and ② (20% of the overall evaluation). |
| | ③ ∟ | |
| | ④ ∟ | Quiz 3 will focus on target ability ③. Quiz 4 will focus on target abilities ④ and ⑤. |
| | ⑤ ∟ | In the final quiz, students will be evaluated on target abilities from ③ to ⑤ (20% of the overall evaluation). Each quiz will comprise 6% of the overall evaluation (for a total of 24%). |
| | ⑥ | |
| Reports | ① ∟ | Students will be evaluated on their reports (16%). |
| | ② ∟ | Students are expected to show their logical thinking in the assignments. |
| | ③ ∟ | Students are required to show their procedures for solutions/calculation logically and are not allowed to copy from others. |
| | ④ ∟ | The deadline for reports will be announced by the instructors. |
| | ⑤ ∟ | |
| | ⑥ | |
| Presentations | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Works | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Portfolios | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Others | ① | Students will be evaluated on assignments, exercises, preparation, and review. All of them will comprise 20% of the overall evaluation. |
| | ② | Attendance and attitude in class are included in this category, too. |
| | ③ | (Students are expected to utilize the Math. and Science Education Research Center or the office hours of the instructors if they have any questions.) |
| | ④ | |
| | ⑤ | |
| | ⑥ ∟ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| (1) Fully describe equations of motion for a given motion of an object using Newton's laws of motion. (2) Fully understand the equations of motion and accurately solve separable, 1st-order linear and 2nd-order, linear, homogeneous differential equations. (3) Accurately evaluate line integrals, and find the works. (4) Accurately evaluate areas and volumes using definite integrals and find the center of gravity. (5) Fully understand multiple integrals and accurately find the moments of inertia. (6) Demonstrate an understanding of all topics and complete all assignments. | (1) Describe equations of motion for a given motion of an object using Newton's laws of motion. (2) Understand the equations of motion, and solve separable, 1st-order linear and 2nd-order, linear, homogeneous differential equations. (3) Evaluate line integrals and find the works. (4) Evaluate areas and volumes using definite integrals and find the center of gravity. (5) Understand multiple integrals and find the moments of inertia. (6) Demonstrate an understanding of all topics and complete all assignments. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Course introduction<br><br>Displacement, velocity, and acceleration | Instruction<br><br>Lecture and exercise | Understand the course objectives.<br>Rev.: Displacement, velocity, and acceleration<br>Prev.: Motion in one dimension | 200 |
| 2 / | Motion in one dimension<br><br>Motion in two dimension: Projectile motion | Lecture and exercise | Self-study: Review of differentiation<br>Rev.: Displacement, velocity, and acceleration<br>Prev.: Newton's laws of motion | 200 |
| 3 / | Motion in two dimension: Circular motion<br><br>Newton's laws of motion | Lecture and exercise | Self-study: Review of differentiation<br>Rev.: Various motions<br>Prev.: Applications of Newton's laws of motion | 200 |
| 4 / | Newton's laws of motion<br><br>Applications of Newton's laws of motion | Lecture and exercise | Self-study: Review of integration<br>Rev.: Newton's laws of motion<br>Prev.: Applications of Newton's laws of motion | 200 |
| 5 / | Applications of Newton's laws of motion<br><br>Motion with force of friction | Lecture and exercise | Self-study: Review of integration<br>Rev.: Various motions<br>Prev.: Review of introductory mechanics | 200 |
| 6 / | Review of introductory mechanics | Lecture and exercise | Rev.: Introductory mechanics<br>Prev.: Quiz 1 | 200 |
| 7 / | Quiz 1<br><br>Taylor series and Maclaurin series<br><br>Euler's formula | Quiz<br><br>Lecture and exercise | Self-study: Taylor series<br>Rev.: Quiz 1<br>Prev.: Simple, 1st-order differential equations | 200 |
| 8 / | Simple, 1st-order differential equations | Lecture and exercise<br><br>Result announcement of quiz 1<br>Self-check | Self-study: Simple, 1st-order differential equations<br>Rev.: Taylor series<br>Prev.: Separable, 1st-order differential equations | 200 |
| 9 / | Separable, 1st-order differential equations | Lecture and exercise | Self-study: Separable differential equations<br>Rev.: Solution to differential equations<br>Prev.: 1st-order linear differential equations | 200 |
| 10 / | 1st-order linear differential equations | Lecture and exercise | Self-study: Solution curve group<br>Rev.: 1st-order linear differential equations<br>Prev.: 2nd-order, linear, differential equations | 200 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | 2nd-order, linear, homogeneous differential equations | Lecture and exercise | Self-study: Solutions to quadratic equations and complex numbers<br>Rev.: 2nd-order, linear, homogeneous differential equations | 200 |
| 12 / | Review of differential equations | Lecture and exercise | Rev.: Various differential equations<br>Prev.: Quiz 2 | 200 |
| 13 / | Quiz 2<br>[Report 1]<br> Significant digit, Scientific notation<br> Application of differential equations to engineering | Quiz<br><br>Lecture and exercise | Self-study: Review of integrals and differential equations<br>Rev.: Quiz 2<br>Prev.: Report 1 | 200 |
| 14 / | [Report 1]<br> Application of differential equations to engineering<br> Review of the first half | Lecture and exercise<br>Exercises on #1-#13<br>Result announcement of quiz 2<br>Self-check | Self-study: Report 1<br>Rev.: Class contents of #1-#13 | 200 |
| 15 / | Intermediate quiz<br><br>Arc length of a curve and line integrals | Intermediate quiz<br><br>Result announcement of report 1<br>Self-check | Self-study: Arc length of a curve and line integrals<br>Rev.: Intermediate quiz<br>Self-check; Confirmation of submission, attendance<br>Prev.: Works and powers | 200 |
| 16 / | Works and powers<br><br>Self-check | Lecture and exercise<br><br>Result announcement of intermediate quiz<br>Self-check of the first half | Self-study: Dot product of two vectors<br>Rev.: Works and powers<br>Prev.: Various integrals | 200 |
| 17 / | Review: Arc length of a curve, line integrals, and works | Lecture and exercise | Rev.: Various integrals<br>Prev.: Quiz 3 | 200 |
| 18 / | Quiz 3<br><br>Moments of force<br><br>Center of gravity of point masses | Quiz<br><br>Lecture and exercise | Self-study: Various integrals<br>Rev.: Center of gravity of point masses, quiz 3<br>Prev.: Areas between two curves | 200 |
| 19 / | Areas between two curves<br><br>The center of gravity of a thin plate | Lecture and exercise<br><br>Result announcement of quiz 3<br>Self-check | Self-study: Various integrals<br>Rev.: The center of gravity of a thin plate<br>Prev.: Multiple integrals and iterated integrals | 200 |
| 20 / | Multiple integrals and iterated integrals | Lecture and exercise | Self-study: Various integrals<br>Rev.: Multiple integrals and iterated integrals<br>Prev.: Volume of a solid and its center of gravity | 200 |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 21 / | Volume of a solid and its center of gravity | Lecture and exercise | Self-study: Polar coordinates<br>Rev.: Multiple integrals and iterated integrals<br>Prev.: Volume of a solid of revolution | 200 |
| 22 / | Volume of a solid of revolution and its center of gravity | Lecture and exercise | Self-study: a solid of revolution<br>Rev.: Volume of a solid of revolution and its center of gravity<br>Prev.: Moments of inertia | 200 |
| 23 / | Moments of inertia | Lecture and exercise | Self-study: Density<br>Rev.: Moments of inertia<br>Prev.: Various multiple integrals | 200 |
| 24 / | Review of multiple integrals | Lecture and exercise | Self-study: Various integrals<br>Rev.: Multiple integrals<br>Prev.: Quiz 4 | 200 |
| 25 / | Quiz 4<br><br>[Report 2]<br>Moments of inertia | Lecture and exercise<br><br>Quiz | Self-study: Report 2<br>Rev.: Quiz 4 | 200 |
| 26 / | [Report 2]<br>Moments of inertia | Lecture and exercise<br><br>Result announcement of quiz 4 | Self-study: Report 2<br>Rev.: Quiz 4 | 200 |
| 27 / | [Report 2]<br>Moments of inertia<br><br>Review of the second half | Lecture and exercise | Self-study: Report 2<br>Rev.: Class contents of #15-#27<br>Prev.: Final quiz | 200 |
| 28 / | Review of the second half | Exercises on #15-#27<br>Result announcement of report 2<br>Self-check | Rev.: Class contents of #15-#27, report 2<br>Prev.: Final quiz | 200 |
| 29 / | Review of the report 2<br><br>Final quiz | Lecture<br><br>Final quiz | Rev.: Final quiz<br>Self-check: Confirmation of submission, attendance | 200 |
| 30 / | Review of the final quiz<br><br>Self-check | Review of the final quiz<br>Result announcement of the final quiz<br>Self-check<br>Questionnaire | Rev.: Final quiz | 200 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Required | Applied Mathematics I | 2 | 522100 | First | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | WATANABE, Shuji | Kanazawa C: 23.403 | | Make an appointment in class |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Vectors and Scalars<br>2 Dot product, Cross product<br>3 Lines and Planes<br>4 Linear transformation<br>5 Coordinate transformation | Students will learn:<br>(1) vector operations.<br>(2) to represent lines and planes using vectors.<br>(3) matrix operations.<br>(4) to represent linear transformations of a plane or a space. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. Each 45 50-minute study time is worth one credit, and students must have 30 50-minute self-study times for 15 50-minute classes.

This is a basic course in linear algebra. We will cover the following topics:
1. Vectors
    1.1 Vectors and their operations
    1.2 Dot products and cross products of vectors
    1.3 The equation of a plane or a line
2. Matrices and linear maps
    2.1 Matrices and their operations
    2.2 Linear maps and linear transformations
    2.3 Various coordinate systems

Classes include exercises and quizzes; a final quiz will be given at the end of the semester.

Daily preparation and review are important. Students are required to complete the designated tasks.

Students should prepare reports and study research topics in a planned manner and strictly avoid plagiarism

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Vector Calculus (license: CC BY)
(http://www.mecmath.net/VectorCalculus.pdf)
A First Course in Linear Algebra, K. Kuttler (license: CC BY)
(https://lila1.lyryx.com/textbooks/KUTTLER_1/marketing/Kuttler-LinearAlgebra-AFirstCourse-2021A.pdf)
Reference books: None
Reserved books: None

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic knowledge of mathematics, especially trigonometric functions.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | h | Represent situations by mathematical expressions. |
| ② | h | Understand the concept of vectors and be able to properly perform vector operations. |
| ③ | h | Understand the concept of matrices and be able to properly perform matrix operations. |
| ④ | h | Understand the concept of linear transformations and be able to represent them in matrix form. |
| ⑤ | h, i | Understand the contents of the course and be able to complete the required tasks by the announced deadlines. |
| ⑥ | | |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | | 0 | 60 | 15 | 0 | 0 | 0 | 25 | 100 |
| Comprehensive Strength Criteria | Ability to capture knowledge | 0 | 40 | 0 | 0 | 0 | 0 | 15 | 55 |
| | Ability to think, reason and create | 0 | 20 | 10 | 0 | 0 | 0 | 5 | 35 |
| | Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Announcement / Expression / Communication | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 10 |
| | Attitude and motivation for learning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

\* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① ⊬ | There will be four quizzes. The 1st, 2nd, and 3rd quizzes will account for 10% of the overall evaluation, while the final quiz will account for 30%. The final quiz will be administered at the end of the semester to evaluate student achievement. |
| | ② ⊬ | |
| | ③ ⊬ | |
| | ④ ⊬ | |
| | ⑤ | |
| | ⑥ | |
| Reports | ① ⊬ | Three reports will be assigned and comprise 15% of the overall evaluation. |
| | ② ⊬ | |
| | ③ ⊬ | |
| | ④ ⊬ | |
| | ⑤ | |
| | ⑥ | |
| Presentations | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Works | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Portfolios | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Others | ① | An assessment of the exercises and homework results during the class will comprise 25% of the overall evaluation. |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ ⊬ | |
| | ⑥ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| (1) Properly perform vector operations and find the equations of planes, lines, or curves.<br>(2) Understand the concept of linear maps and properly determine representation matrices.<br>(3) Understand coordinate transformations and represent vectors in various coordinate systems. | (1) Properly perform vector operations.<br>(2) Properly perform matrix operations.<br>(3) Find representation matrices of linear transformations in a plane.<br>(4) Able to perform coordinate transformation |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Course Introduction<br>Space and Vectors<br>Vector operations 1<br>  1) Addition of vectors<br>  2) subtraction of vectors<br>  3) scalar multiplication of vectors | Lecture and exercises | Understand the objectives of the course<br>Review materials from the previous course<br>Preview for Dot product | 200 |
| 2 / | Unit vector and basis vector<br>Vector operations 2<br>  1) Dot product<br>  2) Cross product | Lecture and exercises | Review materials from the last class<br>Preview for dot products and cross products | 200 |
| 3 / | Applications of inner and cross products<br>  1) Angle between two vectors<br>  2) Area of parallelograms and triangles<br>3) The volume of a parallelepiped | Lecture and exercises | Review materials from the last class<br>Preview for equation of lines and the quiz | 200 |
| 4 / | Quiz (1)<br>Equations of lines<br>The intersection of two lines | Quiz on the contents of #1-#3<br>Lecture and exercises | Review materials from the last class<br>Preview for equations of lines | 200 |
| 5 / | Equations of planes<br>The intersection of a line and a plane<br>The intersection line of two planes | Lecture and exercises<br>Return quiz results<br>Self-check | Review materials from the last class<br>Preview for equations of planes | 200 |
| 6 / | Distance between a point and a line<br>Distance between a point and a plane | Lecture and exercises | Review materials from the last class<br>Preview for intersection and intersection line | 200 |
| 7 / | Curves and surfaces | Lecture and exercises | Review materials from the last class<br>Preview for matrix operations and the quiz | 200 |
| 8 / | Quiz (2)<br>Matrix operations:<br>  1) Addition, Scalar multiplication<br>  2) Multiplication of matrices<br>  3) Inverse matrices | Quiz on contents of # 4 - # 7<br>Lecture and exercises | Review row reduction<br>Preview for multiplication of matrices | 200 |
| 9 / | Linear transformation<br>Matrix representation of linear transformation | Lecture and exercises<br>Return quiz results<br>Self-check | Review materials from the last class<br>Preview for linear maps and linear transformations | 200 |
| 10 / | Compositions of linear transformations<br>Inverse transformations | Lecture and exercises | Review materials from the last class<br>Preview for compositions of linear transformations and inverse transformations | 200 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Oblique coordinate system | Lecture and exercises | Review materials from the last class<br>Preview for the quiz | 200 |
| 12 / | Quiz (3)<br>Integrated subject:<br>  Affine Transformation | Quiz on contents of # 8 - # 11<br>Lecture and exercises | Review materials from the last class<br>Preview for mean, variance, covariance, and correlation coefficient | 200 |
| 13 / | Integrated subject:<br>  Gram–Schmidt orthonormalization<br><br>Review for the final quiz | Lecture and exercises<br>Return quiz (3) results<br>Self-check<br>Self-study / Q&A | Preview for the quiz | 200 |
| 14 / | Final quiz | Quiz on contents of # 1 - # 11<br>Self-study / Q&A | | 200 |
| 15 / | Final quiz return<br>Self-check | Return final quiz results and reports on integrated subject | | 200 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Required | Applied Mathematics II | 2 | 522200 | Second | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | NAKAGAWA, Hayato / HUSSIEN, Alaa | Kanazawa C: 23.403 | | Make an appointment in class |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Vectors and matrices <br> 2 Row reduction <br> 3 Determinants <br> 4 Eigenvalues and eigenvectors <br> 5 Regional cooperation | Students will learn: <br> (1) Vector operations and matrix operations. <br> (2) Solving systems of linear equations using "row reduction." <br> (3) The properties of a determinant and a method to calculate determinants. <br> (4) Eigenvalues and eigenvectors <br> (5) Class management and a special lecture will be given in cooperation with local residents and companies. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.

This is a basic course in applied mathematics, continued from "Applied Mathematics I." We will cover the following topics:
1. Vectors and Matrices
2. Systems of linear equations and row reduction
3. Linear transformation
4. Determinants
5. Linearly independence
6. Eigenvalues and eigenvectors

Classes include exercises and quizzes.

Daily preparation and review are important. Students are required to complete the designated tasks.

Students should prepare reports and study research topics in a planned manner, and strictly avoid plagiarism.

### Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: A First Course in Linear Algebra, K. Kuttler
(https://lila1.lyryx.com/textbooks/KUTTLER_1/marketing/Kuttler-LinearAlgebra-AFirstCourse-2023A.pdf)
Reference books: Linear Algebra (KIT Mathematics, Science, Data Science and AI Programs)

### Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Students should understand the concepts introduced in "Applied Mathematics I".
Basic computational skills for mathematical expressions (calculation of literal expressions, linear and quadratic equations, trigonometric functions) and knowledge of coordinate planes.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | h | Understand the concept of vectors and matrices, and be able to properly perform operations. |
| ② | h | Understand the concept of systems of linear equations by using row reduction. |
| ③ | h | Understand the properties of determinants and be able to calculate the value of a determinant. |
| ④ | h | Understand the concept of linear transformations and be able to find the eigenvalues and eigenvectors. |
| ⑤ | i | Understand the meanings of fundamental English words for mathematics. |
| ⑥ | i | Understand the contents of the course and be able to complete the required tasks by the announced deadlines. |

## Evaluation Criteria

| Evaluation Method <br> Criteria and Ratio | | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | | 0 | 60 | 15 | 0 | 0 | 0 | 25 | 100 |
| Comprehensive Strength Criteria | Ability to capture knowledge | 0 | 35 | 0 | 0 | 0 | 0 | 15 | 50 |
| | Ability to think, reason and create | 0 | 25 | 10 | 0 | 0 | 0 | 0 | 35 |
| | Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Announcement / Expression / Communication | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| | Attitude and motivation for learning | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | ⌴ | There will be three quizzes. Each of the 1st and 2nd quiz will comprise 15% of the overall evaluation, and the final quiz will comprise 30% (for a total of 30+30%). The final quiz will be given at the end of the semester to assess the degree of student achievement. |
| | ② | ⌴ | |
| | ③ | ⌴ | |
| | ④ | ⌴ | |
| | ⑤ | ⌴ | |
| | ⑥ | | |
| Reports | ① | ⌴ | Several reports will be assigned and will together comprise 10% of the overall evaluation. An integrated subject will comprise 5% of the overall evaluation. |
| | ② | ⌴ | |
| | ③ | ⌴ | |
| | ④ | ⌴ | |
| | ⑤ | ⌴ | |
| | ⑥ | | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | | An assessment of the results of the exercises and homework during the class will comprise 25% of the overall evaluation. |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | ⌴ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| ・Perform properly vector operations and matrix operations.<br>・Solve "complex" linear systems using row reduction.<br>・Understand the concept of linear transformations and properly determine representation matrices.<br>・Understand the definition and properties of determinants and be able to calculate determinants.<br>・Understand the properties of cofactors and find inverse matrices.<br>・Find the eigenvalues and eigenvectors of matrices and apply them to diagonalization. | ・Perform vector operations and matrix operations.<br>・Solve "fundamental" linear systems using row reduction.<br>・Find representation matrices of linear transformations in a plane.<br>・Understand the properties of determinants and be able to calculate determinants.<br>・Find inverse matrices using cofactors.<br>・Find the eigenvalues and eigenvectors of simple matrices. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Course introduction<br>Vectors and vector operations (Addition, Subtraction, Scalar multiplication) | Lecture and exercises | Understand the objectives of class<br>Review materials from the previous course<br>Prepare for next class | 200 |
| 2 / | Matrices and matrix operations (Addition, Subtraction, Scalar multiplication, Matrix multiplication)<br>Square matrices | Lecture and exercises | Review materials from the previous course<br>Prepare for next class | 200 |
| 3 / | Inverse matrices<br>Row reduction | Lecture and exercises | Review materials from the previous course<br>Prepare for next class | 200 |
| 4 / | Inverse matrices of order 3 | Lecture and exercises | Review materials from the previous course<br>Prepare for next class | 200 |
| 5 / | Quiz (1)<br><br>Definition of liner transformation and representation matrix | Quiz on the contents of #1 - #4<br>Lecture and exercises | Review materials from the previous course<br>Prepare for next class | 200 |
| 6 / | Compositions of linear transformations<br>Inverse transformations | Lecture and exercises<br>Return quiz results<br>Self-check | Review materials from the previous course<br>Prepare for next class | 200 |
| 7 / | Definition of determinant<br>Calculation of determinants of order 2 and 3 | Lecture and exercises | Review materials from the previous course<br>Prepare for next class | 200 |
| 8 / | Calculation method of determinants based on the properties of determinants | Lecture and exercises | Review materials from the previous course<br>Prepare for next class | 200 |
| 9 / | Cofactor expansion and its applications | Lecture and exercises | Review materials from the previous course<br>Prepare for next class | 200 |
| 10 / | Quiz (2)<br><br>Dot products of vectors<br>Cross products of 3-dim vectors | Quiz on the contents of #5 - #9<br>Lecture and exercises | Review materials from the previous course<br>Prepare for next class | 200 |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Linear independence, Linear dependence of vectors | Lecture and exercises Return quiz results Self-check | Review materials from the previous course Prepare for next class | 200 |
| 12 / | Eigenvalues and eigenvectors | Lecture and exercises | Review materials from the previous course Prepare for next class | 200 |
| 13 / | Diagonalization and its applications Review | Lecture and exercises | Review materials from the previous course. Study for the final quiz | 200 |
| 14 / | Review Final quiz | Review Quiz on contents of #1 - #13 | Study for the final quiz Review of this class | 200 |
| 15 / | Review the final quiz Self-check | Review the final quiz Self-check | Review: Final quiz | 200 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Mech. Required | Machining | 2 | 540100 | First | Experiment / Practice Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | HAYASHI, Michihiro / WOHLFARTH, Brandon | 31-126-1 | | Friday 16:00-17:00 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Machining methods<br>2 Machine tools<br>3 Manufacturing<br>4 Evaluation methods of machine parts<br>5 Collaboration | Students will:<br>(1) Learn functions and structures of various machine tools.<br>(2) Learn how to manufacture the parts with the machine tools.<br>(3) Learn how to select an advantageous machining method within the requirements using basic production manufacturing technology. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.

This course will offer experimental learning in class as a type of active learning.

This course deals with the basics of fundamental machining methods and understanding the function and structure of various machine tools. It also aims to improve both machining and designing skills for manufacturing specific parts.

(1) Outline of manufacturing technology
(2) Milling operations
(3) Turning operations
(4) Drilling operations
(5) Grinding operations
(6) Measurement methods and quality control
(7) Production processes

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

It is essential to obtain licenses for lathes, milling machines, drilling machines, etc., in technical courses provided by Yumekobo.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | d,g,h | Be able to manufacture designed parts by using machine tools. |
| ② | g,h | Be able to understand the functions and structures of various machine tools. |
| ③ | a,b,h | Be able to understand basic manufacturing methods. |
| ④ | g,h | Be able to select an advantageous processing method with enough accuracy. |
| ⑤ | d,h | Be able to understand measurement methods to verify the required accuracy. |
| ⑥ | b,d,h | Be able to understand the positioning of machining technology in manufacturing. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 50 | 30 | 0 | 0 | 10 | 0 | 10 | 100 |
| Ability to capture knowledge | 20 | 20 | 0 | 0 | 0 | 0 | 0 | 40 |
| Ability to think, reason and create | 30 | 10 | 0 | 0 | 5 | 0 | 0 | 45 |
| Collaboration and leadership | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 5 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| Attitude and motivation for learning | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |

(Comprehensive Strength Criteria)

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | There is an exam at the end of the semester to evaluate the degree of achievement. |
| | ② | ∠ | |
| | ③ | ∠ | |
| | ④ | ∠ | |
| | ⑤ | ∠ | |
| | ⑥ | | |
| Quizzes | ① | | There are tests when each chapter is finished to evaluate the level of understanding. The quizzes on the following five chapters, 1) Basics of manufacturing, 2) Milling operations, 3) Turning operations, 4) Drilling operations, 5) Grinding operations. |
| | ② | ∠ | |
| | ③ | ∠ | |
| | ④ | ∠ | |
| | ⑤ | ∠ | |
| | ⑥ | | |
| Reports | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | ∠ | Students will be evaluated on the execution plan of the design and function of the final product. |
| | ② | ∠ | |
| | ③ | ∠ | |
| | ④ | ∠ | |
| | ⑤ | ∠ | |
| | ⑥ | ∠ | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | ∠ | Students will be evaluated their contributions within the class. |
| | ② | | |
| | ③ | | |
| | ④ | ∠ | |
| | ⑤ | | |
| | ⑥ | ∠ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| (1) Designed parts can be accurately shaped by using machine tools. <br> (2) Fully understand the functions and structures of various machine tools. <br> (3) Explain the basic manufacturing methods and their contents correctly. <br> (4) An advantageous manufacturing method can be selected to realize the accuracy required on the drawing. <br> (5) Explain the measurement method to accurately verify the accuracy required on the drawing. | (1) Designed parts can be shaped by using machine tools. <br> (2) Understand the functions and structures of various machine tools. <br> (3) Explain the basic manufacturing methods and their contents. <br> (4) An advantageous manufacturing method can be selected which achieves the required accuracy on the drawing. <br> (5) Explain the measurement method to verify the required accuracy on the drawing. |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Course introduction | Lecture and Q&A Self-check | Understand the course objectives<br>Confirm the course schedule | 100<br><br>100 |
| 2 / | Basics of metal cutting | Lecture and Q&A Self-check | Yumekobo safety license | 200 |
| 3 / | Basics of milling<br>Structure of the milling machine and the milling operation | Lecture and Q&A Self-check | Yumekobo milling license | 200 |
| 4 / | Application of milling<br>Mechanism of machine center, control of CNC machine tool | Lecture and Q&A Self-check | Practice of milling machine | 200 |
| 5 / | Basics of turning<br>Structure of the universal lathes and the turning operation | Quiz<br>Lecture and Q&A Self-check | Yumekobo lathe license | 200 |
| 6 / | Application of turning<br>Mechanism of turn center, control of CNC lathe | Lecture and Q&A Self-check | Practice of lathe | 200 |
| 7 / | Basics of drilling<br>Structure of the drilling presses and the drilling operation | Quiz<br>Lecture and Q&A Self-check | Yumekobo drill press license | 200 |
| 8 / | Mechanism of drilling | Lecture and Q&A Self-check | Practice drill press | 200 |
| 9 / | Basics of grinding<br>Structure of the grinding machine and the grinding operation | Quiz<br>Lecture and Q&A Self-check | Yumekobo electric and electronic license | 200 |
| 10 / | Application of grinding<br>Mechanism of the grinding process and characteristics of the whetstone | Lecture and Q&A Self-check | Yumekobo wood working license | 200 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Finishing surface accuracy | Quiz<br>Lecture and Q&A<br>Self-check | Practice how to use the file, whetstone and grinding wheel | 200 |
| 12 / | Measurement methods and quality control of workpiece | Lecture and Q&A<br>Self-check | Practice how to use the caliper and micrometer | 200 |
| 13 / | Design the machine part manufactured by using milling, turning and drilling machine | Lecture and practice<br>Self-check | Finish drawing of the part | 200 |
| 14 / | Manufacture the part designed in class 13 | Lecture and practice<br>Self-check | Finish manufacturing of the part | 200 |
| 15 / | Report about the part designed and manufactured in class 13 and 14 | Lecture and practice<br>Self-check | Preview: Confirm the manufactured part<br>Review: Writing report of the manufactured part | 20<br><br>180 |
| 16 / | Final examination | Descriptive test | Self-evaluation | |
| 17 / | Review | Self-check & review | | |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Mech. Required | Technical Drawing | 2 | 541200 | First | Exercises Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | HAYASHI, Michihiro / EVANS, Davis | 31-126-1 | | Fri. 16:30-17:30 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Orthographic projection method<br>2 Isometric projection<br>3 Basics of design and drafting<br>4 Handwritten drafting and CAD<br>5 Size tolerance | Students will:<br>(1) learn the principles of orthographic projection, which is the basis of mechanical drawing.<br>(2) learn the ability to accurately create 2D drawings according to the third angle projection method.<br>(3) practice handwritten drafting and CAD to create drawings efficiently. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.

This course will offer problem-solving learning and experimental learning in class as a type of active learning.

Mechanical drawings are the most important basic means of communication for mechanical engineers to accurately convey their ideas. Machine drawing information includes not only the shape and dimensions of parts, but also the "dimensional accuracy", "shape accuracy", and "position/posture accuracy" required for each functional form that makes up the part to perform its functions. It teaches the orthographic projection method, which is the basis of mechanical drafting, and the creation of 2D mechanical drawings.

We will cover the following topics:
1. Guidance on how to conduct lessons
2. Isometric projection and cabinet projection drawing
3. Orthographic projection and 2D drafting, and basic drafting rules for mechanical drawings
4. Functions of CAD, and drawing creation procedures
5. Size tolerance and fit

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: New JIS Mechanical Drawing (6th edition), Morita Kita Publishing, ISBN 978-4-627-66116-5
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Lectures are "stacked" learning (work on new subjects is based on the knowledge and abilities acquired in the previous week's class). Therefore, students should review the material in the weekly lectures thoroughly and fully understand it by the next lecture.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | e,g,i | Be able to understand the principles of orthographic projection and express the shape of machine parts. |
| ② | e,g,i | Be able to understand the basic drafting rules for mechanical drawings and draw drawings. |
| ③ | e,g,i | Be able to draw front, top, and side views of machine parts. |
| ④ | e,g,i | Be able to draw 3D drawings using isometric projection and cabinet projection drawings. |
| ⑤ | e,g,i | Be able to sketch mechanical parts accurately and create hand-drawn mechanical drawings based on these sketches. |
| ⑥ | e,g,i | Be able to create machine drawings using CAD figure creation and figure editing functions. |

## Evaluation Criteria

| Evaluation Method<br>Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 20 | 20 | 60 | 0 | 0 | 0 | 0 | 100 |
| Comprehensive Strength Criteria — Ability to capture knowledge | 10 | 10 | 15 | 0 | 0 | 0 | 0 | 35 |
| Ability to think, reason and create | 5 | 5 | 15 | 0 | 0 | 0 | 0 | 25 |
| Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Announcement / Expression / Communication | 5 | 5 | 15 | 0 | 0 | 0 | 0 | 25 |
| Attitude and motivation for learning | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 15 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

## Evaluation Method

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | ✓ | In the final exam, the degree of comprehension of "principles of orthographic projection", "fit", "creation of mechanical drafting (practical method)", etc., is evaluated. |
| | ② | ✓ | |
| | ③ | ✓ | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | | |
| Quizzes | ① | ✓ | In the mid-term test, the degree of comprehension of "drafting rules for mechanical drawings", "third-angle projection drawing", "isometric projection drawing", "dimensions", "size tolerance", etc., is evaluated. |
| | ② | ✓ | |
| | ③ | ✓ | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | | |
| Reports | ① | ✓ | Evaluate each assignment (classwork and homework). The purpose of the assignment is to ensure that the understanding and application skills of the lesson content are established. Please manage the due date sufficiently. In particular, ensure sufficient time and work systematically. You will not be able to complete the assignments if you rush to complete them once the submission date is approaching. |
| | ② | ✓ | |
| | ③ | ✓ | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| (1) Accurately understand the third trigonometric method and basic drafting rules used for machine drafting. (2) Accurately understand the basic line types used in machine drawings and their roles. (3) Select the necessary projections by analyzing the geometric features of parts and determine the main projections appropriately. (4) Sketch machine parts accurately, and create hand-drawings based on the sketches. (5) Understand the size tolerances and surface roughness of machine parts and accurately indicate them in drawings. | (1) Understand the trigonometry and basic drawing rules used to create mechanical drawings. (2) Accurately understand the basic line types used in machine drawings and their roles. (3) Select a necessary projection by analyzing the shape characteristics of a part and determine a main projection. (4) Sketch mechanical parts and make hand-drawn 2D mechanical drawings based on these sketches. (5) Understand the size tolerances of machine parts, the size tolerances of surface roughness products, and the surface roughness, and indicate them in drawings. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | [Guidance on class implementation]<br><br>[Reviewing of mechanical drawing]<br><br>[Mechanical drawing standards]<br><br>[Lines] | (1) Explain the outline of this course. Understand the relationship between this course and the learning objectives of the department.<br><br>(2) Recognize the information shown in the mechanical drawing by looking at the drawing example.<br><br>(3) Lecture the types of standards established to standardize the industry in general.<br><br>(4) Preparation and use of drafting tools.<br><br>(5) Lecture the lines used for mechanical drawing and their uses.<br><br>(6) Practice drawing lines according to the drafting example. | Review:<br>Understand the relationship between the learning objectives of the department and this course<br><br>Understand the selection of drawing paper size in standards of mechanical drawing<br><br>Homework:<br>Complete the rest of the exercises | 200 |
| 2 / | [Typeface of character]<br><br>[Drafting paper and scale] | (1) Lecture the typeface used for mechanical drawing and their uses.<br><br>(2) Practice typeface of character according to the drafting example.<br><br>(3) Lecture the paper size used for drafting and recommended scales. | Homework:<br>Make a drawing frame template | 200 |
| 3 / | [Orthographic projection] | (1) Lecture on the projection method by third angle system.<br><br>(2) Exercise of third angle system drawing with thinking about the front view. | Homework:<br>Complete the rest of the exercises | 200 |
| 4 / | [Isometric projection] | (1) Lecture on how to show the shape of an item three-dimensionally.<br><br>(2) Exercise of the isometric projection drawing.<br><br>(3) Exercise of the cabinet projection drawing. | Homework:<br>Complete the rest of the exercises | 200 |

| | | | | |
|---|---|---|---|---|
| 5 / | [Dimensioning method]<br><br>[Freehand drawing 1-1] | (1) Lecture on the basic method of filling in dimensions.<br><br>(2) Lecture on the symbol for dimensioning.<br><br>(3) Create a drawing of the packing gland. | Homework:<br>Proceed with drawing | 200 |
| 6 / | [Freehand drawing 1-2] | (1) Complete a drawing of the packing gland.<br><br>(2) Inspect the drawing yourself.<br><br>(3) Inspect drawings drawn by others. | Homework:<br>Correct and complete the drawing<br><br>Review:<br>Reconfirmation of un-acquired items for the intermediate test. | 200 |
| 7 / | [Mid-term test]<br><br>[Freehand drawing 2-1] | (1) Self-inspection of learning comprehension level with mid-term test.<br><br>(2) Lecture on screw thread specifications and drawing methods.<br><br>(3) Exercise of the screw drawings. | Review:<br>Understand the drawing method of the screw thread.<br><br>Homework:<br>Correct and complete the drawing | 200 |
| 8 / | [Freehand drawing 2-2] | (1) Create a hexagon head bolt fastening drawing. | Homework:<br>Correct and complete the drawing | 200 |
| 9 / | [Freehand drawing 3-1] | (1) Lecture on how to draw gears.<br><br>(2) Calculate typical specifications of gears.<br><br>(3) Create a drawing of spur gear. | Homework:<br>Proceed with drawing | 200 |
| 10 / | [Freehand drawing 3-2] | (1) Complete a drawing of spur gear. | Homework:<br>Correct and complete the drawing | 200 |
| 11 / | [Size tolerance] | (1) Lecture on dimensional tolerances.<br><br>(2) Lecture on the system of fits.<br><br>(3) Exercises of dimensional tolerance and system of fits. | Homework:<br>Complete the rest of the exercises<br><br>CAD software installation | 200 |
| 12 / | [CAD drawing 1] | (1) Set up a CAD environment.<br><br>(2) Lecture of basic CAD operating method.<br><br>(3) Create a spanner shape model. | Homework:<br>Make and complete a drawing | 200 |
| 13 / | [CAD drawing 2-1] | (1) Create the miniature jack parts models.<br><br>(2) Create a miniature jack assembly model. | Homework:<br>Correct and complete the CAD models | 200 |

| 14 / | [CAD drawing 2-2] | (1) Create miniature jack parts drawings. | Homework: Correct and complete the parts drawings | 200 |
|---|---|---|---|---|
| 15 / | [CAD drawing 2-3] | (1) Create a miniature jack assemble drawing. | Homework: Correct and complete the assemble drawing<br><br>Review: Reconfirmation of un-acquired items for the achievement test. | 200 |
| 16 / | Final exam | | Review all materials | |
| 17 / | Returning final exam results | | | |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Mech. Elective | Robot Mechanics | 2 | 540500 | First | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | KUSHIMA, Yoshihiro / EVANS, Davis | Kanazawa C | | 16:50~17:30 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Particle Dynamics<br>2 Kinematics<br>3 Kinetics<br>4 Momentum<br>5 Impulse | Continue improving your understanding of Newton's equation of motion as the basis for dynamics, such as the movement of a particle caused by external force or torque.<br>Prepare for subsequent specialized mechanics courses.<br>Acquire the knowledge necessary for the design and analysis of complex machines such as robots. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.

This course will offer experimental learning in class as a type of active learning.

This is a continuation of Engineering Mechanics. For studying mechanics, it is important to solve a variety of mechanical problems independently in addition to understanding the meaning of terms and mathematical formulas.

In this course, the following basic mechanics topics are covered:

Kinematics of a Particle
- Force and Acceleration
- Work and Energy
- Impulse and Momentum

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks: Engineering Mechanics: Dynamics in SI Units (PEARSON)
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Be familiar with the mathematics and physics used in basic engineering to solve a number of exercise problems.
Acquire the content of this class, which is essential for understanding specialized subjects in the following year.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | h, i | Be able to explain Rectangular, Normal and Tangential Coordinates. |
| ② | h, i | Be able to explain Systems of Particles. |
| ③ | h, i | Be able to explain Power and Efficiency. |
| ④ | h, i | Be able to explain Conservative Forces, Potential Energy and Conservation of Energy. |
| ⑤ | h, i | Be able to explain Linear Impulse and Momentum. |
| ⑥ | h, i | Be able to explain Angular Impulse and Momentum. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 40 | 20 | 40 | 0 | 0 | 0 | 0 | 100 |
| Ability to capture knowledge | 20 | 10 | 20 | 0 | 0 | 0 | 0 | 50 |
| Ability to think, reason and create | 10 | 5 | 10 | 0 | 0 | 0 | 0 | 25 |
| Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Attitude and motivation for learning | 10 | 5 | 10 | 0 | 0 | 0 | 0 | 25 |

(Comprehensive Strength Criteria)

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | ✓ | A written exam is given at the end of the term. Understanding the ideas behind the equations of motion is as important as memorizing these equations. |
| | ② | ✓ | |
| | ③ | ✓ | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |
| Quizzes | ① | ✓ | Several 50-minute quizzes are given to improve comprehension. |
| | ② | ✓ | |
| | ③ | ✓ | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |
| Reports | ① | ✓ | Students will prepare and submit reports to demonstrate their understanding of assigned topics and issues. |
| | ② | ✓ | |
| | ③ | ✓ | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| - Able to explain Rectangular, Normal and Tangential Coordinates.<br>- Able to explain Systems of Particles.<br>- Able to explain Power and Efficiency.<br>- Able to explain Conservative Forces, Potential Energy and Conservation of Energy.<br>- Able to Linear Impulse and Momentum.<br>- Able to Angular Impulse and Momentum. | - Understand Rectangular, Normal and Tangential Coordinates.<br>- Understand Systems of Particles.<br>- Understand Power and Efficiency.<br>- Understand Conservative Forces, Potential Energy and Conservation of Energy.<br>- Understand Linear Impulse and Momentum.<br>- Understand Angular Impulse and Momentum. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Course introduction<br><br>Introduction & Rectilinear Kinematics: Continuous Motion | Lecture and Q&A | Understand the objectives of the course<br>Review lecture content and assignments | 200 |
| 2 / | Rectilinear Kinematics: Erratic Motion<br><br>Curvilinear Motion: General & Rectangular Components | Lecture and Q&A | Review lecture content and assignments | 200 |
| 3 / | Newton's Laws of Motion, Equations of Motion, & Equations of Motion for a System of Particles | Lecture and Q&A | Review lecture content and assignments | 200 |
| 4 / | Equations of Motion: Rectangular Coordinates | Lecture and Q&A | Review lecture content and assignments | 200 |
| 5 / | Equations of Motion: Normal and Tangential Coordinates<br><br>Review for Quiz 1 | Lecture and Q&A | Review lecture content and assignments | 200 |
| 6 / | Quiz 1 | Review | Review lecture content and assignments | 200 |
| 7 / | Quiz 1 Return<br><br>The Work of a Force, the Principle of Work and Energy & Systems of Particles | Review and Quiz | Review lecture content and assignments | 200 |
| 8 / | Power and Efficiency | Lecture and Q&A | Review lecture content and assignments | 200 |
| 9 / | Conservative Forces, Potential Energy and Conservation of Energy | Lecture and Q&A | Review lecture content and assignments | 200 |
| 10 / | Principle of Linear Impulse and Momentum | Lecture and Q&A | Review lecture content and assignments | 200 |

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Principle of Linear Impulse and Momentum and Conservation of Linear Momentum for Systems of Particles | Lecture and Q&A | Review lecture content and assignments | 200 |
| 12 / | Impact | Lecture and Q&A | Review lecture content and assignments | 200 |
| 13 / | Angular Momentum, Moment of a Force and Principle of Angular Impulse and Momentum  Review for Quiz 2 | Review | Review lecture content and assignments | 200 |
| 14 / | Quiz 2 | Review and Quiz | Review lecture content and assignments | 200 |
| 15 / | Quiz 2 Return Review for Final Exam | Review | Review lecture content and assignments | 200 |
| 16 / | Final Exam | Exam | Check comprehension for the entire course | 50 |
| 17 / | Final Exam Return Self-evaluation | Review Self-evaluation | Review | 50 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Mech. Elective | Design of Machine Element | 2 | 540200 | Second | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | HAN, Justin | 31.119 | | Tuesday 5-5:30 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Mechanical Design<br>2 Mechanical Loads<br>3 Material Strength<br>4 Material Failure<br>5 Mechanical Elements | Machine Elements are the foundations of any physical and mechanical system that is used in society. Students in this course will study how these elements are designed along with the considerations involved with applying these designs to the physical world. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.
This course will offer experiential learning in class as a type of active learning.

With a focus on design methodology, the progression of this course is as follows:
1. Strength and Stiffness of materials
   - Loads and Material strength
   - Material Failure
2. Mechanical Elements
   - Shafts and couplings
   - Screws
   - Bearings
   - Gears

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Design of Mechanical Elements: A Concise Introduction to Mechanical Design Considerations and Calculations ISBN-13: 978-1119849964
Reference books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

An understanding of:
- Algebra
- Static mechanics

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | b, g, h | Be able to explain the effect of forces on material strength and reliability. |
| ② | b, g, h | Be able to explain the conditions for material failure and methods for failure prevention. |
| ③ | b, g, h | Be able to explain the design process for screws. |
| ④ | b, g, h | Be able to explain the design process for bearings. |
| ⑤ | b, g, h | Be able to explain the design process for gears. |
| ⑥ | b, g, h | Be able to explain the design process for shafts. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 40 | 20 | 40 | 0 | 0 | 0 | 0 | 100 |
| Ability to capture knowledge | 20 | 10 | 15 | 0 | 0 | 0 | 0 | 45 |
| Ability to think, reason and create | 20 | 10 | 15 | 0 | 0 | 0 | 0 | 45 |
| Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Announcement / Expression / Communication | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |
| Attitude and motivation for learning | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | ✓ | There will be a final exam at the end of the semester that will test students on the important concepts introduced throughout the semester. |
| | ② | ✓ | |
| | ③ | ✓ | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |
| Quizzes | ① | ✓ | There will be two 50-minute quizzes that will test students on the concepts introduced in the weeks before the quiz. For these quizzes, students will be allowed to prepare one sheet of notes for reference. Makeup quizzes will not be allowed without a valid excuse. |
| | ② | ✓ | |
| | ③ | ✓ | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |
| Reports | ① | ✓ | There will be homework for every topic introduced. Time will be allotted during class to review the homework assignments, but students will need to spend time outside of class to complete them. Late homework will be accepted after their submission deadline at a -10% late penalty per school day up to a max of 50%. However, any homework that is copied will result in a 0. |
| | ② | ✓ | |
| | ③ | ✓ | |
| | ④ | ✓ | |
| | ⑤ | ✓ | |
| | ⑥ | ✓ | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| - Able to calculate and explain efficient designs based on various loadings conditions<br>- Able to explain and incorporate material failure into design considerations<br>- Able to design and/or apply screws based on situational considerations<br>- Able to design and/or apply bearings based on situational considerations<br>- Able to design and/or apply gears based on situational considerations<br>- Able to design and/or apply shafts and couplings based on situational considerations | - Able to calculate the strength characteristics of a mechanical element subjected to simple loads.<br>- Able to explain the various methods of material failure.<br>- Able to explain the types and purposes of screws.<br>- Able to explain the types and purposes of bearings.<br>- Able to explain the types and purposes of gears.<br>- Able to explain the types and purposes of shafts and couplings. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Introduction to Machine Component Design<br><br>Students learn about the considerations involved with machine component design. | Lecture | Review: Complete Assignment | 200 |
| 2 / | Introduction to Load Analysis<br><br>Students learn and review about the different types of loads and how loads affect physical materials. | Lecture | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 3 / | Introduction to Material Strength and Failure<br><br>Students learn about mechanical stress, allowable stress, factor of safety, and material failure. | Lecture | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 4 / | Introduction to Shafts I<br><br>Students learn about the characteristics of shafts and couplings. | Lecture | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 5 / | Introduction to Shafts II<br><br>Students learn about the basic considerations in the design and application of shafts and couplings. | Lecture | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 6 / | Introduction to Shafts III<br><br>Students learn about the more considerations in the design and application of shafts and couplings. | Lecture | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 7 / | Midterm Test | Quiz and Review | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 8 / | Introduction to Screws I<br><br>Students learn about the types and characteristics of screws. | Lecture | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 9 / | Introduction to Screws II<br><br>Students learn about the various considerations in the design and application of screws. | Lecture | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 10 / | Introduction to Bearings I<br><br>Students learn about the types and characteristics of bearings. | Lecture | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Introduction to Bearings II<br><br>Students learn about the various considerations in the design and application of bearings. | Lecture | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 12 / | Introduction to Gears I<br><br>Students learn about the types and characteristics of gears. | Lecture | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 13 / | Introduction to Gears II<br><br>Students learn about the various considerations in the design and application of gears. | Lecture | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 14 / | End-of-Term Test | Quiz and Review | Preview: Read Assigned Chapters<br>Review: Complete Assignment | 200 |
| 15 / | Review | Lecture | Preview: Prepare review questions<br>Review: Study for the final exam | 200 |
| 16 / | Final examination | Descriptive test<br>Self-check | Self-evaluation | |
| 17 / | Review | Self-check & review | | |

# 2025 Syllabus

| Field | Course Name | | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|---|
| Dept. S Specialized Mech. Elective | Thermodynamics | | 2 | 540600 | Second | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | NAGANUMA, Kaname | 44.203 | | Make an appointment in class |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Heat<br>2 Property and Unit<br>3 Temperature and Heat<br>4 Ideal gas<br>5 The 1st law of thermodynamics | Students will:<br>(1) learn basic knowledge for heat, energy<br>(2) learn how to energy conversion, heat to work<br>(3) acquire design skills for energy conversion in mechanical engineering |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.

This course will offer discovery learning, investigative learning, and debate in class as a type of active learning.

This is a basic course of thermodynamics. We will cover the following materials:
1. Thermal equilibrium and the zeroth law of thermodynamics
2. Heat, specific heat capacity and other basic units
3. The 1st law of thermodynamics
4. Characteristics of ideal gas and real gas
5. Energy and enthalpy
6. Energy conversion

Students are expected to understand the meaning of terms and formulas.

Students are expected to solve the exercises by yourself.

Students should be aware of the teacher's instructions in the class, because the schedules of quizzes, tests and reports may change as the class progresses.

Students should not be absent the class, as the handouts may be not received.

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Thermodynamics, English-Japanese Bilingual Textbook Series of Fundamental Engineering, Masataka Arai and Tomohiko Furuhata, Morikita Publishing

Reference books:
 Technical Thermodynamics for Engineers -Basic and Applications-, Achim Schmidt, Springer

Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Enough skill of mathematics (especially differential / integral calculations)
How to use a calculator.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | g, h, i | Be able to explain the zero law of thermodynamics and apply to a subject |
| ② | g, h, i | Be able to explain the characteristics of ideal gas and apply to a subject |
| ③ | g, h, i | Be able to explain the characteristics of mixed gas and apply to a subject |
| ④ | g, h, i | Be able to explain the zeroth law of thermodynamics |
| ⑤ | g, h, i | Be able to explain the 1st law of thermodynamics |
| ⑥ | | |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | | 0 | 60 | 40 | 0 | 0 | 0 | 0 | 100 |
| Comprehensive Strength Criteria | Ability to capture knowledge | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 10 |
| | Ability to think, reason and create | 0 | 40 | 20 | 0 | 0 | 0 | 0 | 60 |
| | Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Announcement / Expression / Communication | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |
| | Attitude and motivation for learning | 0 | 10 | 10 | 0 | 0 | 0 | 0 | 20 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | ✔ | There are tests to evaluate the level of understanding. |
| | ② | ✔ | |
| | ③ | ✔ | |
| | ④ | ✔ | |
| | ⑤ | ✔ | |
| | ⑥ | | |
| Reports | ① | ✔ | Students will be evaluated on reports. |
| | ② | ✔ | |
| | ③ | ✔ | |
| | ④ | ✔ | |
| | ⑤ | ✔ | |
| | ⑥ | | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| (1) Explain the thermal phenomenon, property, the zero law of thermodynamics, temperature and quantity of heat. Also solve the advanced problems related issue by these understanding.<br>(2) Explain the ideal gas. Also solve the advanced problems related issue by these understanding.<br>(3) Explain the 1st law of thermodynamics. Also solve the advanced problems related issue by these understanding.<br>(4) Explain the real gas. Also solve the advanced problems related issue by these understanding. | (1) Explain the thermal phenomenon, property, the zero law of thermodynamics, temperature and quantity of heat. Also solve the basic problems related issue by these understanding.<br>(2) Explain the ideal gas. Also solve the basic problems related issue by these understanding.<br>(3) Explain the 1st law of thermodynamics. Also solve the basic problems related issue by these understanding.<br>(4) Explain the real gas. Also solve the basic problems related issue by these understanding. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Introduction | Lecture Self-check | Prepare chpt.1.1- 1.4 on the text book. Review | 100 100 |
| 2 / | Property and units | Lecture and practice Self-check | Prepare chpt.2.1- 2.6 on the text book. Review the class | 100 100 |
| 3 / | Temperature and quantity of heat | Lecture and practice Self-check | Prepare chpt.3.1- 3.4 on the text book. Review | 100 100 |
| 4 / | Review | Review and practice Self-check | Review the previous contents Review | 100 100 |
| 5 / | Ideal gas (1) | Lecture and practice Self-check | Prepare chpt.4.1- 4.2 on the text book. Review | 100 100 |
| 6 / | Ideal gas (2) | Lecture and practice Self-check | Prepare chpt.4.3- 4.4 on the text book. Review | 100 100 |
| 7 / | Ideal gas (3) | Lecture and practice Self-check | Prepare chpt.4.5- 4.6 on the text book. Review | 100 100 |
| 8 / | Review | Review and practice Self-check | Review the previous contents Review | 100 100 |
| 9 / | Test (1) | Test Self-check | Review the previous contents Review | 100 100 |
| 10 / | The 1st law of thermodynamics (1) | Lecture and practice Self-check | Prepare chpt.5.1- 5.4 on the text book. Review | 100 100 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | The 1st law of thermodynamics (2) | Lecture and practice Self-check | Prepare chpt.5.2- 5.5 on the text book. Review | 100 100 |
| 12 / | Test (2) | Review and practice Self-check | Review the previous contents Review | 100 100 |
| 13 / | Review(1) | Test and Quizzes Self-check | Review the previous contents Review the test | 100 100 |
| 14 / | Review(2) | Test and Quizzes Self-check | Review the previous contents Review the test | 100 100 |
| 15 / | Introduction to Thermo Engineering II | Review Self-check | Review the previous contents | 200 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Mech. Elective | Fluid Mechanics | 2 | 540900 | Second | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | EVANS, Davis | 31.114-1 | | Friday 16:30-17:30 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Fluid Properties<br>2 Pressure and Total pressure<br>3 Bernoulli's principle<br>4 Continuity equation<br>5 Law of momentum | In this lecture, you will learn the basics of fluid dynamics. Learn the basic properties of fluids, Bernoulli's theorem, continuity equation, law of momentum, etc. In order to acquire the ability to apply principles to practice, students will master application examples through exercises. A good understanding of these principles is a prerequisite for a mechanical engineer. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.

This course will offer time dedicated to fluid mechanics problem solving and modeling projects in class as a type of active learning.

■ Class structure: As for the structure of the lesson, have them work on their homework after the lecture.

■ About the lecture: As a general rule, classes are conducted based on textbooks.

■ About homework: Do homework every week. Work on homework during class and self-study time and submit by next time

### Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks: *Understanding Fluid Flow* by Grae Worster
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

1 Fundamental understanding of solid body mechanics & physics
2 Calculus skills & knowledge of differentiation, integration, and solving Ordinary Differential Equations (ODEs)

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | h | Be able to explain the properties of fluids, especially their compressibility and viscosity. |
| ② | h | From the depth and existing pressure gradient, calculate the total pressure applied to the object. |
| ③ | h | Derive a basic model of fluid flow from mechanical principles such as stress, density, viscosity, and pressure. |
| ④ | h | Perform basic fluid calculations using the continuity equation, Bernoulli's equation, etc. |
| ⑤ | h | Understand the momentum theorem and apply it to actual fluid calculations |
| ⑥ | a | Understand the connection between learning content and community issues, and discuss and learn from each other. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 50 | 0 | 30 | 0 | 20 | 0 | 0 | 100 |
| Comprehensive Strength Criteria — Ability to capture knowledge | 30 | 0 | 10 | 0 | 5 | 0 | 0 | 45 |
| Comprehensive Strength Criteria — Ability to think, reason and create | 20 | 0 | 10 | 0 | 5 | 0 | 0 | 35 |
| Comprehensive Strength Criteria — Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Comprehensive Strength Criteria — Announcement / Expression / Communication | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 10 |
| Comprehensive Strength Criteria — Attitude and motivation for learning | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 10 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

## Evaluation Method

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | ✔ | Comprehensive exam covering topics from lecture and exercise throughout the semester. |
| | ② | ✔ | |
| | ③ | ✔ | |
| | ④ | ✔ | |
| | ⑤ | ✔ | |
| | ⑥ | ✔ | |
| Quizzes | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Reports | ① | ✔ | Homework will be assigned to confirm understanding of the content of each week's lectures. As a general rule, a well though out answer, with work shown and process cited, will receive full credit, even if the final answer is not quite correct. Points will be deducted for missing work, incomplete answers, or failure to show line of reasoning. Points may still be deducted if the line of reasoning deviates too far from the concepts taught in class. |
| | ② | ✔ | |
| | ③ | ✔ | |
| | ④ | ✔ | |
| | ⑤ | ✔ | |
| | ⑥ | ✔ | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | | At the end of the class, students will be asked to submit and perform a presentation on a simple fluid mechanics simulation. The student will be evaluated on both the presentation and the submitted simulation code & files. |
| | ② | | |
| | ③ | ✔ | |
| | ④ | ✔ | |
| | ⑤ | ✔ | |
| | ⑥ | ✔ | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| The basic formula of flow can be derived from fundamental physical and mechanical principles. In particular, the problems related to the following matters can be completely solved. (1) Explain properties such as compressibility and viscosity. (2) The relationship expression between depth and pressure can be established and the total pressure can be calculated. (3) The basic formula of the flow can be derived. (4) Basic fluid calculation can be performed using the continuity equation, Bernoulli's equation, etc. (5) Understand the momentum theorem and apply it to actual fluid force calculation and basic design of fluid machinery. (6) Students can actively participate in in-class discussion sessions. | The following matters can be explained to some extent from the viewpoint of mechanics. (1) Explain the properties of fluids, especially the properties such as compressibility and viscosity. (2) The relationship expression between the depth of the fluid and the pressure can be established, and the total pressure applied to the object can be calculated. (3) The basic equation of flow can be derived. (4) Basic fluid calculation can be performed using the continuity equation, Bernoulli's equation, etc. (5) Understand the momentum theorem and apply it to actual fluid force calculations. (6) Participate in the question-and-answer session when prompted. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Explanation of lesson policy, purpose, outline, etc. Learn about the basic properties of fluids. | Lecture Exercise | Preparation and homework for this week's study | 100 100 |
| 2 / | Learn about the properties of ideal fluids. | Lecture Exercise | Preparation and homework for this week's study | 100 100 |
| 3 / | Learn about the properties of viscous fluids | Lecture Exercise | Preparation and homework for this week's study | 100 100 |
| 4 / | In-class exercise and review. | Exercise | Preparation and homework for this week's study | 100 100 |
| 5 / | Mathematics review: Differentiation | Lecture Exercise | Preparation and homework for this week's study | 100 100 |
| 6 / | Mathematics review: Integration | Lecture Exercise | Preparation and homework for this week's study | 100 100 |
| 7 / | Mathematics review: Solving Ordinary Differential Equations. | Lecture Exercise | Preparation and homework for this week's study | 100 100 |
| 8 / | Parallel viscous flow | Lecture Exercise | Preparation and homework for this week's study | 100 100 |
| 9 / | Parallel viscous flow continued | Lecture Exercise | Preparation and homework for this week's study | 100 100 |
| 10 / | Viscous gravity currents | Lecture Exercise | Preparation and homework for this week's study | 100 100 |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Viscous gravity currents continued | Lecture Exercise | Preparation and homework for this week's study | 100 100 |
| 12 / | In-class exercise & review | Exercise | Preparation and homework for this week's study | 100 100 |
| 13 / | Introduction to numerical analysis & simulation project. (computer required) | Lecture Exercise | Work on simulation project | 100 100 |
| 14 / | Simulation project in-class work. (computer required) | Project Work | Work on simulation project | 100 100 |
| 15 / | Simulation project wrap-up and presentation Test review. (computer required) | Project Work | Work on simulation project | 100 100 |
| 16 / | Final exam | Exam | Study for exam | 100 |
| 17 / | Test return and feedback | Review | | |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Mech. Required | Computer Architecture | 2 | 541400 | Second | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | KUSHIMA, Yoshihiro | 31.117 | | 16:50 ~ 17:30 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Hardware<br>2 Software<br>3 Network<br>4 Single-board computer<br>5 | In this course, students will learn about elemental technologies of computers in order to understand the mechanisms behind the computers in terms of hardware and software. And students also learn the technologies of single-board computers (e.g. Raspberry Pi and/or Jetson Nano). Knowledge from this course is usable in applying a single-board computer to future system development. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minutes study times are worth one credit, and students need to have 30 50-minutes self-study times for 15 50-minutes classes.
This course will offer experimental learning in class as a type of active learning.
This course introduces concepts of elemental technologies of computers including how computers work, memory, CPU, programming, storage, networks, OS, and I/O. Students will also learn about the configuration of the Raspberry Pi known as edge AI devices, through assignments.

Advice on taking this course:
- Be sure to prepare sufficiently for class and the incoming topics in advance.
- Have laptops or notebooks ready for assignment work.
- Submit assignments.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
 Textbooks:
 Reference books:
 Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Knowledge and experience learned and acquired so far.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | i | Students will be able to understand the hardware of a computer. |
| ② | i | Students will be able to understand the software of a computer. |
| ③ | i | Students will be able to understand computer networks. |
| ④ | a, h, i | Students will be able to understand the configuration of single-board computers. |
| ⑤ | | |
| ⑥ | | |

## Evaluation Criteria

| | Evaluation Method<br>Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Total Evaluation Ratio | 0 | 10 | 60 | 0 | 30 | 0 | 0 | 100 |
| Comprehensive Strength Criteria | Ability to capture knowledge | 0 | 5 | 20 | 0 | 0 | 0 | 0 | 25 |
| | Ability to think, reason and create | 0 | 5 | 20 | 0 | 25 | 0 | 0 | 50 |
| | Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Announcement / Expression / Communication | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |
| | Attitude and motivation for learning | 0 | 0 | 10 | 0 | 5 | 0 | 0 | 15 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① ✓ | Students will have short quizzes in class to check their understanding of the contents. |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ | |
| | ⑥ | |
| Reports | ① ✓ | Exercises will be done on every topic. |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ | |
| | ⑥ | |
| Presentations | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Works | ① ✓ | Students will involve a lot of hands-on exercises starting with python programming and establishing a connection to raspberry pi. There is a final project in which each student will need to design an application that combines two or more electronic components. |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ | |
| | ⑥ | |
| Portfolios | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Others | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| ① Students are able to explain the function of each element of hardware and software in computer architecture. | ① Students are able to understand the concept of hardware and software in computer architecture. |
| ② Students are able to explain computer networking correctly. | ② Students are able to understand the basics of computer networking. |
| ③ Students are able to perform IP subnetting correctly. | ③ Students are able to perform simple network calculations using IP addresses. |
| ④ Students are able to design | ④ Students are able to design an outline of possible uses for single-board computers. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Guidance, Recapping Computing<br><br>Understanding the overview of what computers do. | Lecture Exercise | Read the given lecture slides and proceed with exercises. | 200 |
| 2 / | Numbering system<br><br>Understanding the binary notation and hexadecimal notation. | Lecture Exercise | Read the given lecture slides and proceed with exercises. | 200 |
| 3 / | Electric Memory (1)<br><br>Understanding the basics of SRAM and DRAM. | Lecture Exercise | Read the given lecture slides and proceed with exercises. | 200 |
| 4 / | Electric Memory (2)<br><br>Understanding the basics of cache and virtual memory. | Lecture Exercise | Read the given lecture slides and proceed with exercises. | 200 |
| 5 / | Processors<br><br>Understanding the internal workings of CPUs. | Lecture Exercise | Read the given lecture slides and proceed with exercises. | 200 |
| 6 / | Storage<br><br>Understanding the Non-Volatile Storage. | Lecture Exercise | Read the given lecture slides and proceed with exercises. | 200 |
| 7 / | Network<br><br>Understanding the IP routing. | Lecture Exercise | Read the given lecture slides and proceed with exercises. | 200 |
| 8 / | Raspberry Pi Electronic Project (1)<br><br>Understanding a raspberry pi electronic project and choosing electronic elements students want to learn. | Lecture Exercise | Read the given tutorial and proceed with self-project. | 200 |
| 9 / | Raspberry Pi Electronic Project (2)<br><br>Continuing to work on self-project for a raspberry pi electronic project. | Exercise | Read the given tutorial and proceed with self-project. | 200 |
| 10 / | Raspberry Pi Electronic Project (3)<br><br>Continuing to work on self-project for a raspberry pi electronic project. | Exercise | Read the given tutorial and proceed with self-project. | 200 |

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Raspberry Pi Electronic Project (4) Continuing to work on self-project for a raspberry pi electronic project. | Exercise | Read the given tutorial and proceed with exercises. | 200 |
| 12 / | Raspberry Pi Electronic Project (5) Continuing to work on self-project for a raspberry pi electronic project. | Exercise | Read the given tutorial and proceed with exercises. | 200 |
| 13 / | Final Project (1) Understanding a final project and choosing electronic elements for own project. | Lecture Exercise | Read the given tutorial and proceed with self-project. | 200 |
| 14 / | Final Project (2) Continuing to work on self-project for a raspberry pi electronic project. | Exercise | Read the given tutorial and proceed with self-project. | 200 |
| 15 / | Final Project (3) Continuing to work on self-project for a raspberry pi electronic project. | Exercise | Read the given tutorial and proceed with self-project. | 200 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Info. Required | Information Mathematics I | 2 | 550100 | First | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | GUO, Qinglian | 31.104 | | Wednesday 2 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Logic<br>2 Sets<br>3 Counting<br>4 Graphs<br>5 Trees | (1) To learn the foundations of logic and sets<br>(2) To learn the basics of counting<br>(3) To learn graphs and the applications<br>(4) To learn trees and the applications |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.

This course will offer group discussion in class as a type of active learning.

Students are expected to have high school graduate level mathematic knowledge. Also, they are required to have basic skills of using PowerPoint to draw graphs.

【Required Materials (textbooks, reference books, reserved books)】
Textbooks:
Reference books: Discrete mathematics and its application, Kenneth H. Rosen (AT&T), McGraw-Hill, Inc.
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | g, h, i | Ability to capture the basic knowledge of sets, graphs, and trees |
| ② | g, h, i | Ability to use the knowledge of logic, counting, and sets to explain and solve problems |
| ③ | b, c, d | Ability to collaborate with members to design 3D models using the knowledge of discrete mathematics |
| ④ | g, h, i | Ability to explain sorting algorithms using the knowledge of trees |
| ⑤ | | |
| ⑥ | | |

## Evaluation Criteria

| Evaluation Method / Total Percentage | Exams | Quizzes | Reports | Presentations | Works | Portfolio | Other | Total |
|---|---|---|---|---|---|---|---|---|
| Total Percentage | 0 | 60 | 40 | 0 | 0 | 0 | 0 | 100 |
| Ability to capture knowledge | 0 | 40 | 10 | 0 | 0 | 0 | 0 | 50 |
| Ability to think, reason and create | 0 | 20 | 10 | 0 | 0 | 0 | 0 | 30 |
| Collaboration and leadership | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Attitude and motivation for learning | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |

(Comprehensive Strength Criterion)

＊ The numerical breakdown shown by Comprehensive Strength Criterion is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | ∨ | |
| | ② | ∨ | |
| | ③ | ∨ | Twice 2x30% |
| | ④ | ∨ | |
| | ⑤ | | |
| | ⑥ | | |
| Reports | ① | ∨ | |
| | ② | ∨ | |
| | ③ | ∨ | Twice 20%X2 |
| | ④ | ∨ | |
| | ⑤ | | |
| | ⑥ | | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Ability to explain the basic knowledge and applications of logic, sets, counting, graphs, trees, and sorting algorithms. Ability to collaborate with members to design 3D models using the knowledge of discrete mathematics. Ability to create animation of the models. | Ability to explain the basic knowledge of sets, graphs, and trees. Ability to collaborate with members to design 3D models using the knowledge of discrete mathematics. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Orientation<br>Install software of Blender<br>The foundations of logic | Lecture and exercise | Review | 200 |
| 2 / | Sets<br>Set operations<br>Practicing of set operations (using Blender) | Lecture and exercise | Preview<br>Review | 80<br>120 |
| 3 / | Set operations<br>Set applications<br>Practicing of 3D models design and creation | Lecture and exercise | Preview<br>Review | 80<br>120 |
| 4 / | The basics of counting<br>Practicing of 3D models design and creation | Lecture and exercise | Preview<br>Review | 80<br>120 |
| 5 / | Counting and discrete probability<br>Practicing of 3D models design and creation | Lecture and exercise | Preview<br>Review | 80<br>120 |
| 6 / | Introduction to graphs<br>Report1 submission | Lecture and exercise | Preview<br>Review | 80<br>120 |
| 7 / | Various graphs<br>Practicing of 3D models design and creation | Lecture and exercise | Preview<br>Review | 80<br>120 |
| 8 / | Euler and Hamilton paths<br>Quiz (30%) | Quiz and exercise | Preview<br>Review | 80<br>120 |
| 9 / | Shortest path problems<br>Graph coloring<br>Practicing of 3D models design and creation | Lecture and exercise | Preview<br>Review | 80<br>120 |
| 10 / | Introduction to tree<br>Practicing of 3D models design and creation | Lecture and exercise | Preview<br>Review | 80<br>120 |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Tree traversal<br>Practicing of trees and 3D models creation | Lecture and exercise | Preview<br>Review | 80<br>120 |
| 12 / | Trees and sorting tree<br>Report 2 submission: trees and 3D models creation | Lecture and exercise | Preview<br>Review | 80<br>120 |
| 13 / | Trees and sorting tree<br>Trees and computer | Lecture and exercise | Preview<br>Review | 80<br>120 |
| 14 / | Trees and sorting tree<br>Trees and computer | Lecture and exercise | Preview<br>Review | 80<br>120 |
| 15 / | Quiz (30%)<br>Explain and Answers<br>Summary<br>Interview | Exam and lecture | Preview<br>Review | 80<br>120 |

# 2025 Syllabus

| Field | Course Name | | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|---|
| Dept. S Specialized Info. Required | Information Mathematics II | | 2 | 550200 | Second | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | HAYASHI, Ryoko | Yatsukaho C:67.321 | | Make an appointment in class |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Probability<br>2 Statistics<br>3 Data science<br>4<br>5 | Probability and statistics are two of the basic knowledge of science and technology. Machine learning has been attracting attention in recent years, and probability and statistics are the basis of machine learning. In this course, students will acquire basic knowledge of probability and statistics, which are essential in science and technology, through classroom lectures and practical training. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.

This course will offer computer exercises in class as a type of active learning.

In this course, you will learn the basic contents of probability and statistics in classroom lectures, and deepen your understanding through computer exercises.

You will use Python for most computer exercises, but also use Excel.

The order of the learning contents shown in the course schedule is a guide, and the details will be provided by the instructor.

At least the following contents will be included:

- Basics of Python, basics of Excel
- Probability (dependent and independent, conditional probability, random variable, normal distribution)
- Statistics (representative values, scatter, correlation, statistical hypothesis testing, confidence intervals, Bayesian inference)

Other contents may be added at the discretion of the instructor.

Some programming experience is desirable, but not required at the beginning of the course. If necessary, study by yourself during the course period to supplement the programming abilities required to acquire this course.

## Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Data Science from Scratch, Second Edition, Joel Crus, O'Reilly, (2019).

Reference books:

Reserved books: 「ゼロからはじめるデータサイエンス第２版」, (2020) (in Japanese).

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Knowledge of mathematics is required. Specifically, you should have a general understanding of the basics of inequalities, equations, elementary functions such as polynomial functions and exponential functions, and calculus.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | b | Students will learn the application of probability and understand the significance of returning the knowledge to society. |
| ② | g | Students will learn the basics of how to handle data and understand the possibility of creating new value from data. |
| ③ | h | Students will be able to express their thoughts on statistical information on various events. |
| ④ | i | Students will acquire basic probability and statistical knowledge and experience with a view to developing into data science. |
| ⑤ | | |
| ⑥ | | |

## Evaluation Criteria

| Evaluation Method<br>Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 60 | 0 | 0 | 0 | 0 | 40 | 100 |
| Comprehensive Strength Criteria — Ability to capture knowledge | 0 | 30 | 0 | 0 | 0 | 0 | 10 | 40 |
| Ability to think, reason and create | 0 | 30 | 0 | 0 | 0 | 0 | 10 | 40 |
| Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 |
| Attitude and motivation for learning | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | ✔ | Make sure that you understand the basic knowledge of probability and statistics, and that you can apply it properly. |
| | ② | ✔ | |
| | ③ | ✔ | |
| | ④ | ✔ | |
| | ⑤ | | |
| | ⑥ | | |
| Reports | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | ✔ | Make sure that you understand the basic knowledge of probability and statistics, and that you can apply it properly. In order to confirm whether you can handle the learning contents properly using a computer, you may need to submit deliverables of computer training. |
| | ② | ✔ | |
| | ③ | ✔ | |
| | ④ | ✔ | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| You can fully understand the learning contents related to probability and statistics and apply them to real-world problems. You can master both Python and Excel in computer training and apply the learning contents to actual data. | You can generally understand the learning contents related to probability and statistics, and apply the basic contents to real-world problems. In computer training, you can apply the learning contents to actual data using at least one of Python and Excel. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Guidance. Explanation of outline of the subject, how to proceed with the lesson, preparation, review, and evaluation method Textbook Chapter 1 Introduction | It is basically face-to-face, but it may be done online. | Review (install and check Python, try using Python) | 200 |
| 2 / | Textbook Chapter 2 (First Half) Python Quick Learning Course Chapter 3 Data Visualization | It is basically face-to-face, but it may be done online. | Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python) | 60 140 |
| 3 / | Textbook Chapter 2 (Second Half) Python Quick Learning Course Chapter 4 Linear algebra | It is basically face-to-face, but it may be done online. | Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python) | 60 140 |
| 4 / | Textbook Chapter 5 Statistics Excel work for Statistics | It is basically face-to-face, but it may be done online. | Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python) | 60 140 |
| 5 / | Textbook Chapter 6 Probability (First half) Comprehensive Exercise 1 | It is basically face-to-face, but it may be done online. | Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python) | 60 140 |
| 6 / | Quiz 1 Textbook Chapter 6 Probability (Second half) | It is basically face-to-face, but it may be done online. | Review (lean the previous parts of the textbook) Review (resolve the problem) | 60 140 |
| 7 / | Textbook Chapter 7 Hypothesis and Presumption (First half) Quiz 1 review | It is basically face-to-face. | Preparation for quiz Review (actually process data on a computer using Python) | 140 60 |
| 8 / | Textbook Chapter 7 Hypothesis and Presumption (Second half) | It is basically face-to-face, but it may be done online. | Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python) | 60 140 |
| 9 / | Textbook Chapter 8 Gradient descent method Comprehensive Exercise 2 | It is basically face-to-face, but it may be done online. | Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python) | 60 140 |
| 10 / | Quiz 2 Textbook Chapter 9 Getting Data (First half) | It is basically face-to-face, but it may be done online. | Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python) | 60 140 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Textbook Chapter 9 Getting data (Second half) Quiz 2 review | It is basically face-to-face, but it may be done online. | Preparation (learn the relevant part of the textbook)<br><br>Review (actually process data on a computer using Python) | 60<br><br>140 |
| 12 / | Textbook Chapter 10 Working with Data (First half) | It is basically face-to-face, but it may be done online. | Preparation (learn the relevant part of the textbook)<br><br>Review (actually process data on a computer using Python) | 60<br><br>140 |
| 13 / | Textbook Chapter 10 Working with Data (Second half) Comprehensive exercise 3 | It is basically face-to-face, but it may be done online. | Review (lean the previous parts of the textbook)<br><br>Review (resolve the problem) | 140<br><br>60 |
| 14 / | Quiz 3 Textbook Chapter 11 Machine Learning | It is basically face-to-face. | Preparation for quiz<br><br>Review (actually process data on a computer using Python) | 140<br>60 |
| 15 / | Quiz 3 review For future development of probability and statistics, further learning | It is basically face-to-face, but it may be done online. | Preparation (learn the relevant part of the textbook)<br><br>Review (actually process data on a computer using Python) | 60<br><br>140 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Info. Required | Computer System A | 2 | 550600 | First | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | OGAWA, Hayato | 101.201 | | 16:30 to 17:30 (Week day) |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Digital number system<br>2 Logic gates<br>3 Boolean algebra<br>4 Karnaugh map<br>5 Sequential circuits | Students will learn to understand the operation and design of combinational and sequential logic circuits that construct computer memory systems. This course will guide the students to perform conversion of the digital number system, understanding the working of logic gates, using Karnaugh map to simply Boolean expression, and designing a digital counter circuit using flip-flops. |

### Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.

This course will offer discovery learning, problem-solving learning, experiential learning, investigative learning in class as a type of active learning.

In this course, students will be introduced to the basics of digital circuits and systems. The course is prepared to provide students with basic knowledge of digital memory circuits based on combinational logic circuits and sequential circuits. After completing the course, students should be able to explain and discuss the basics principles of digital memory circuits. This course includes lectures, hands-on work, and an individual project.

Advice on taking this course:
- Be prepared for class and study the incoming topics in advance.
- Do the assignment and make sure to submit all your work on time.
- English will be the main challenge in this course. Make sure you ask for help from the teacher or friends.

The use of an electronics dictionary is strongly encouraged.

### Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:

Reference books:

Reserved books:

### Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

1. Ability to perform simple algebra operations.
2. Basics knowledge of mathematical operations (add, subtraction, multiplication, and division)

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | a,h | Students will be able to perform the conversion of digital number systems. |
| ② | a,h | Students will be able to write Boolean algebra expressions of the given combinational circuits. |
| ③ | a,h | Students will be able to use the Karnaugh map to simplify Boolean algebra expression. |
| ④ | a,h,i | Students will be able to design circuits from the simplified Boolean algebra expression. |
| ⑤ | a,h | Students will be able to explain the operation of latches and flip-flop. |
| ⑥ | a,h,i | Students will be able to design an Asynchronous counter and a Synchronous counter. |

### Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 20 | 40 | 0 | 40 | 0 | 0 | 100 |
| Comprehensive Strength Criteria — Ability to capture knowledge | 0 | 10 | 0 | 0 | 20 | 0 | 0 | 30 |
| Ability to think, reason and create | 0 | 10 | 20 | 0 | 20 | 0 | 0 | 50 |
| Collaboration and leadership | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |
| Announcement / Expression / Communication | 0 | 0 | 5 | 0 | 0 | | 0 | 5 |
| Attitude and motivation for learning | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | ∟ | There are five quizzes in this course. Each quiz accounted for 5 points out of a total of 25 points. |
| | ② | ∟ | |
| | ③ | ∟ | • Students who are absent during the day can ask the teacher to reschedule the quiz. |
| | ④ | ∟ | • However, rescheduling must be within the same week of the quiz. |
| | ⑤ | ∟ | |
| | ⑥ | | |
| Reports | ① | ∟ | Weekly exercises will be handed to the students based on what they have learned in the week. All target ability related question will be included in the exercise. |
| | ② | ∟ | |
| | ③ | ∟ | • If a student is absent, it is the responsibility of the student to collect the weekly exercise from the teacher. |
| | ④ | ∟ | |
| | ⑤ | ∟ | Completed weekly exercise must be submitted on time as mentioned by the teacher. |
| | ⑥ | ∟ | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | ∟ | There are two small projects and one final project. Each small project accounted for 5 points out of the total of 40 points. The remaining 20 points are covered in the final project. The projects will test students' cognitive and psychomotor skills related to what they have learned in the class. |
| | ② | ∟ | |
| | ③ | ∟ | |
| | ④ | ∟ | |
| | ⑤ | ∟ | Project assignment/worksheet must be submitted on time as mentioned by the teacher. |
| | ⑥ | ∟ | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Students can understand and explain the working principle of logic gates with the correct schematic diagram. | Students can understand the concept of the working principle of logic gates correctly. |
| Students can perform simplification of Boolean expressions using the Karnaugh map. | Students can perform simplification of Boolean expressions using the Karnaugh map. |
| Students can design Asynchronous and Synchronous counter complete with the logic circuits and timing diagram | Students can design Asynchronous and Synchronous counter correctly. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | i. Syllabus guidance<br>ii. Digital number system<br>  - Binary, decimal, hexadecimal<br>Conversion of the number system | - Lecture<br>Worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 2 / | i. Quiz 1 (Binary, decimal, and hexadecimal)<br>ii. Introduction to basic logic gates and universal gates<br>  - Read MIL symbol and Boolean expression.<br>Boolean algebra | - Lecture<br>Worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 3 / | i. Quiz 2 (Boolean Algebra)<br>ii. Sum-of-Product (SOP) & Product-of-Sum (POS)<br>Karnaugh map (K-Map) | - Lecture<br>Worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 4 / | i. Simplification of Boolean expression using Karnaugh map<br>  - Draw circuits from the simplified Boolean expression.<br>Quiz 3 (K-Map) | - Lecture<br>Worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 5 / | Project 1 (Simulation software)<br>Design of Binary-Coded Decimal (BCD) circuit. | - Project worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 6 / | i. Binary addition and arithmetic circuits 1<br>Understand half adder and full adder circuits | - Lecture<br>Worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 7 / | i. Binary addition and arithmetic circuits 2<br>  - Subtraction using 2`complement method.<br>  - Understand adder-subtractor circuits.<br>ii. Quiz 4 (Binary addition and subtraction) | - Lecture<br>Worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 8 / | i. Decoder and Encoder<br>Understand decoder and encoder circuits | - Lecture<br>Worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 9 / | i. Latches and flip – flops 1<br>  - Introduction to SR, JK, and D flip-flops<br>  - Understand the characteristics of a flip-flop with a truth table and timing diagrams. | - Lecture<br>Worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 10 / | i. Latches and flip – flop 2<br>  - Introduction to SR, JK, and D flip-flops<br>  - Understand the characteristics of a flip-flop with a truth table and timing diagrams.<br>Quiz 5 (flip-flop) | - Lecture<br>Worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | i. Asynchronous counter<br>- Understand the working principle of asynchronous counter.<br>- Design asynchronous counter. | - Lecture<br>Worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 12 / | i. Project 2 (Hardware)<br>Design a 2-bit asynchronous counter. | - Construct a physical asynchronous digital circuit.<br>complete project worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 13 / | i. Synchronous counter<br>- Understand the working principle of synchronous counter.<br>- Design a synchronous counter. | - Lecture<br>Worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 14 / | i. Final Project (Simulation software)<br>Design a 3-bit truncated sequence synchronous counter. | - Design and construct a synchronous counter simulation using software.<br>Complete project worksheet | - Read PowerPoint notes.<br>Complete Exercise | 200 |
| 15 / | Final Project Review and course review | -Feedback on final project and review of total course and final circuit | - clean up and put back equipment and parts to parts bin and shelf | 200 |

# 2025 Syllabus

| Field | Course Name | | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|---|
| Dept. S Specialized Info. Required | Computer System B | | 2 | 550700 | Second | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | SANG-NGENCHAI, Apirak | 31-125-1 | | Wed. 16.30 - 17.30 |

## Course Objectives

| Keywords (10.5pt) | | Learning Objectives (10.5pt) |
|---|---|---|
| 1 | Hardware | In this course, students will learn about the elemental technologies of computers to understand the mechanisms behind computers in terms of hardware and software. Students will design and simulate a 4-bit CPU using logic circuits and implement it on an FPGA board. The course emphasizes a hands-on approach, bridging theory and practice in digital system design. |
| 2 | Software | |
| 3 | Network | |
| 4 | FPGA | |
| 5 | | |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes. This course will offer experiential learning in class as a type of active learning.

This course introduces concepts of computer elemental technologies, including how computers work, memory, CPU, storage, and networks. Students will also learn to design and simulate a 4-bit CPU using logic circuits and implement it on an FPGA board.

Advice on taking this course:
- Be sure to prepare sufficiently for class and the incoming topics in advance.
- Have laptop ready for assignment work.
- Submit assignments.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic knowledge of computers and CPU architecture.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | i | Students will be able to understand the hardware of a computer. |
| ② | i | Students will be able to understand computer software. |
| ③ | i | Students will be able to understand the computer networks. |
| ④ | a, h, i | Students will be able to understand the basics of 4-bit CPU design. |
| ⑤ | a, h, i | Students will be able to understand the simple FPGA architecture and its implementation. |
| ⑥ | | |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 10 | 30 | 0 | 60 | 0 | 0 | 100 |
| Ability to capture knowledge | 0 | 5 | 10 | 0 | 25 | 0 | 0 | 40 |
| Ability to think, reason and create | 0 | 5 | 10 | 0 | 25 | 0 | 0 | 40 |
| Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Announcement / Expression / Communication | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 10 |
| Attitude and motivation for learning | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 10 |

(Comprehensive Strength Criteria)

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | ∨ | Students will have short quizzes to check their understanding of the contents in class. |
| | ② | ∨ | |
| | ③ | ∨ | |
| | ④ | ∨ | |
| | ⑤ | ∨ | |
| | ⑥ | | |
| Reports | ① | | Students will write a report for their final project assignment. |
| | ② | | |
| | ③ | | |
| | ④ | ∨ | |
| | ⑤ | ∨ | |
| | ⑥ | | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | ∨ | Students will receive weekly exercises related to the week's material. |
| | ② | ∨ | |
| | ③ | ∨ | If a student is absent, they must obtain the exercise from the teacher and submit it on time. |
| | ④ | ∨ | |
| | ⑤ | ∨ | For the final project, each student will design an application that conveys the knowledge gained from this class. |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Students can explain the function of each hardware and software element in computer architecture. | Students can understand the concept of hardware and software in computer architecture. |
| Students can explain computer networking correctly and perform IP address calculations correctly. | Students can understand the basics of computer networking and perform simple IP address calculations. |
| Students can design and implement a more than 4-bit CPU on an FPGA board. | Students can design a 4-bit CPU and implement it on an FPGA board. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Guidance, Recapping Computing<br><br>Overview of what computers do. | Lecture Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 2 / | Numbering system<br><br>Binary, Decimal, Hexadecimal, Octal systems, and Binary arithmetic. | Lecture Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 3 / | Electric Memory<br><br>The basics of SRAM, DRAM, Cache, and Virtual memory. | Lecture Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 4 / | Central Processing Unit (CPU)<br><br>The internal workings of CPUs. | Lecture Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 5 / | Storage<br><br>Types of storage and Data access methods. | Lecture Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 6 / | Computer Networking (1)<br><br>TCP/IP, Wi-Fi, Ethernet fundamentals, and IP address calculations. | Lecture Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 7 / | Computer Networking (2)<br><br>Understanding IPv4 subnetting and variable-length subnet mask (VLSM). | Lecture Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 8 / | Logic Gates<br><br>Understanding Logic Gates, Truth Tables, Boolean Algebra.<br>Quiz 01 (Fundamental of Computer) | Lecture Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 9 / | Execution Cycle & ALU Instructions<br><br>Understanding the execution cycle of CPU and 1-bit ALU. | Lecture Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 10 / | Four-bit ALU<br><br>Understanding construction of 4-bit ALU based on 1-bit ALU. | Lecture Exercise | Read the lecture slides given and proceed with the exercises. | 200 |

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | CPU Design: Instruction Set<br><br>Understanding simple instruction set for 4-bit CPU.<br>Quiz 02 (Logic Gate and ALU) | Lecture<br>Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 12 / | CPU Design: Registers, ALU and ROM<br><br>Understanding the wiring of registers, ALU, and ROM for building a 4-bit CPU. | Lecture<br>Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 13 / | CPU Design: Decoder<br><br>Understanding the wiring of the decoder to the previous logic circuit for building a 4-bit CPU. | Lecture<br>Exercise | Read the lecture slides given and proceed with the exercises. | 200 |
| 14 / | FPGA Implementation (1)<br><br>Understanding implantation of 4-bit CPU on FPGA board.<br>Quiz 03 (CPU Design) | Exercise | Read the given tutorial and proceed with the exercises. | 200 |
| 15 / | FPGA Implementation (2)<br><br>Understanding implantation of 4-bit CPU on FPGA board. | Exercise | Read the given tutorial and proceed with the exercises. | 200 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Info. Required | Data Structures and Algorithms | 2 | 550900 | First | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | FUJISHIMA, Satoshi | Kanazawa C 31.116 | | Thu. 16.30 - 17.30 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Data Structures<br>2 Algorithms<br>3 Divide and Conquer<br>4 Dynamic Programming<br>5 Hash Function | Data structures and algorithms are fundamental concepts of computer science. Knowledge of data representation, data structures, and algorithms is essential in the development, use, and maintenance of adaptable, reusable, and efficient software. In this course, students will learn about basic data structures and algorithms that provide a foundation for writing efficient computer programs. |

### Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.

This course will offer experiential learning in class as a type of active learning.
Data structures and algorithms have become essential in computer science to develop efficient programs. These programs are used to create web applications, supercomputing, and AI programs, etc.
This course will introduce students to theoretical background using mathematics. Students will be able to apply their programming knowledge through creating original applications.

Advice on taking this course:
- Have laptop ready before class starts.
- Be sure to prepare sufficiently for class and the incoming topics in advance.
- Submit assignments on time.

### Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:
Reference books:
Reserved books:

### Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Students must have the ability to express their ideas logically.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | g, h, i | Recognize the importance of data structures. |
| ② | g, h, i | Recognize the importance of algorithms |
| ③ | g, h, i | Understand the sorting algorithms |
| ④ | g, h, i | Understand the list, queue and stack |
| ⑤ | g, h, i | Understand the divide and conquer vs dynamic programming |
| ⑥ | g, h, i | Understand the hash functions |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 15 | 45 | 0 | 40 | 0 | 0 | 100 |
| Ability to capture knowledge | 0 | 5 | 10 | 0 | 15 | 0 | 0 | 30 |
| Ability to think, reason and create | 0 | 5 | 15 | 0 | 15 | 0 | 0 | 35 |
| Collaboration and leadership | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 10 |
| Announcement / Expression / Communication | 0 | 5 | 10 | 0 | 0 | 0 | 0 | 15 |
| Attitude and motivation for learning | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 10 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | ∟ | There will be three quizzes to check the understanding of the content. |
| | ② | ∟ | |
| | ③ | ∟ | |
| | ④ | | |
| | ⑤ | ∟ | |
| | ⑥ | | |
| Reports | ① | ∟ | Reports are worksheet exercises and written assignment for final project. The reports should be submitted by the due date designated by the instructors. |
| | ② | ∟ | |
| | ③ | ∟ | |
| | ④ | ∟ | |
| | ⑤ | ∟ | |
| | ⑥ | ∟ | |
| Presentations | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Works | ① | ∟ | Works are programming exercises assigned during class. |
| | ② | ∟ | |
| | ③ | ∟ | |
| | ④ | ∟ | |
| | ⑤ | ∟ | |
| | ⑥ | ∟ | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Students can recognize the importance of data structures and algorithms in computer science. | Students can recognize the importance of data structures and algorithms to some extent. |
| Students further understand that using them is crucial to develop efficient software. | Students generally understand their definitions. |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Guidance<br><br>Prime numbers<br>Maze<br>Coloring Problem | Lecture<br>Exercise | The teacher will announce assignments in class. | 200 |
| 2 / | Big O<br>Sorting: Selection sort | Lecture<br>Exercise | The teacher will announce assignments in class. | 200 |
| 3 / | Sorting: Merge sort | Lecture<br>Exercise | The teacher will announce assignments in class. | 200 |
| 4 / | Sorting: Merge sort (2) | Exercise | The teacher will announce assignments in class. | 200 |
| 5 / | Sorting: Quick sort | Lecture<br>Exercise | The teacher will announce assignments in class. | 200 |
| 6 / | Sorting: Quick sort (2)<br><br>Quiz (1) | Exercise | The teacher will announce assignments in class. | 200 |
| 7 / | Stack & Queue | Lecture<br>Exercise | The teacher will announce assignments in class. | 200 |
| 8 / | Knapsack Problem<br><br>Dynamic programming | Lecture<br>Exercise | The teacher will announce assignments in class. | 200 |
| 9 / | Divide and Conquer & Dynamic Programming | Lecture<br>Exercise | The teacher will announce assignments in class. | 200 |
| 10 / | Huffman Coding<br><br>Quiz (2) | Lecture<br>Exercise | The teacher will announce assignments in class. | 200 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No.<br>Date | Class Content (10pt) | Method (10pt) | Assignments (10pt)<br>(Preview and Review) | Time<br>(Minutes) |
|---|---|---|---|---|
| 11<br><br>/ | Huffman Coding (2) | Exercise | The teacher will announce assignments in class. | 200 |
| 12<br><br>/ | Huffman Coding (3)<br><br>Implementation | Lecture<br>Exercise | The teacher will announce assignments in class. | 200 |
| 13<br><br>/ | Huffman Coding (4)<br><br>Decoding<br><br>Quiz (3) | Lecture<br>Exercise | The teacher will announce assignments in class. | 200 |
| 14<br><br>/ | Hash (1) | Lecture<br>Exercise | The teacher will announce assignments in class. | 200 |
| 15<br><br>/ | Hash (2) | Exercise | The teacher will announce assignments in class. | 200 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Info. Required | Software Engineering | 2 | 551000 | Second | Lecture Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | SONGER, Robert | Kanazawa C: 31.115 | | Wed. 16:00 – 17:00 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Development Process<br>2 Requirements Specification<br>3 Software Design<br>4 Software Testing<br>5 Software Maintenance | Software Engineering is a field that generally includes all the professional activities surrounding the development of software products. It combines engineering, computer science, and management to define the process from concept to realization and beyond. Up to this point, students have taken many courses on implementing software programs, so this class will instead focus on planning, designing, testing, and maintaining software. |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes. This course will offer practical hands-on assignments in class as a type of active learning.

Having learned about programming in previous classes, students in this course will instead investigate the context of software development projects and the activities for requirements specification, design, testing, operation, and maintenance. Lessons will include comparisons of the traditional "waterfall" style of development to the more modern "agile" style. Students will gain a deeper understanding of object-oriented concepts and learn Unified Modeling Language (UML) to analyze software design patterns.

Keep a binder or folder for your papers and notes and use good study techniques to pick up the specialized English vocabulary. The teacher may apply a late penalty to your assignments if you are disruptive or do not participate in class activities.

## Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks: None
Reference books: None
Reserved books: None

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Students must know the basic concepts of Object-Oriented Programming and the Python language. In addition, students must be familiar with the idea of software development processes.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | b | Explain the importance of Software Engineering. |
| ② | g, h | Understand and explain all the stages of the software development cycle. |
| ③ | e, h | Explain the differences between traditional and agile development processes. |
| ④ | f, h | Create appropriate documentation for each step of software development. |
| ⑤ | i | Identify important software engineering terms in English. |
| ⑥ | | |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 40 | 60 | 0 | 0 | 0 | 0 | 100 |
| Comprehensive Strength Criteria — Ability to capture knowledge | 0 | 20 | 20 | 0 | 0 | 0 | 0 | 40 |
| Ability to think, reason and create | 0 | 20 | 10 | 0 | 0 | 0 | 0 | 30 |
| Collaboration and leadership | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |
| Announcement / Expression / Communication | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |
| Attitude and motivation for learning | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① ∨ | There are two quizzes during the semester. The first quiz is a short essay that requires students to combine concepts they learned regarding the Software Engineering context. The second quiz is a short test with simple answer type questions such as multiple-choice and fill-in-the-blanks. Each quiz allows the students to confirm their comprehension of the covered content.<br><br>There is one final quiz at the end of the semester which covers all previous topics. |
| | ② ∨ | |
| | ③ ∨ | |
| | ④ ∨ | |
| | ⑤ ∨ | |
| | ⑥ | |
| Reports | ① ∨ | Reports are general assignments including handouts, written reports, and documents created during various in-class activities. Reports will be evaluated based on the accuracy of student responses in most cases. Some types of reports (such as documentation) will be evaluated based on the amount of effort students put into their creation. In general, if a student submits one of these assignments late, **they will lose 20% of its maximum value towards their grade**. |
| | ② ∨ | |
| | ③ ∨ | |
| | ④ ∨ | |
| | ⑤ ∨ | |
| | ⑥ | |
| Presentations | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Works | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Portfolios | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Others | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| ① Describe nuances in the context of engineering software | ① Understand the advantages of the engineering process |
| ② Produce outcomes for all stages of the development lifecycle | ② Identify activities in the development lifecycle |
| ③ Justify choosing a certain development process in a project | ③ Recognize differences in waterfall and agile development |
| ④ Create well-formatted software documentation | ④ Identify documents used at each step of development |
| ⑤ Understand the context of important English words | ⑤ Understand the meaning of important English words |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Guidance & Intro to Software Processes<br><br>Receive an introduction to the course before investigating the software development process. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |
| 2 / | Software Development Processes (1)<br><br>Learn about the software development lifecycle (SDL) and process models. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |
| 3 / | Software Development Processes (2)<br><br>Investigate non-technical challenges for professional software developers. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |
| 4 / | Review & Intro to Software Requirements<br><br>Review the context of software engineering and then investigate system requirements specification. | Lecture<br>Discussion<br>Exercises<br><br>Quiz | The teacher will announce assignments in class. | 200 |
| 5 / | Requirements Specification (1)<br><br>Examine the parts of a System Requirements Specification (SRS) document and the role of Use Cases. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |
| 6 / | Requirements Specification (2)<br><br>Compare Use Cases to User Stories and understand the differences between the two. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |
| 7 / | Waterfall vs. Agile: Requirements<br><br>Investigate the different ways that traditional Waterfall processes and Agile processes handle their requirements. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |
| 8 / | Unified Modeling Language<br><br>Review the components of Unified Modeling Language (UML) and how it is used in software design. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |
| 9 / | Software Design Principles<br><br>Examine the SOLID software design principles and understand various symptoms of bad software design in a project. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |
| 10 / | Software Design Patterns<br><br>Learn the types of software design patterns and consider patterns from each category for the design of a software system. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Review & Intro to Software Testing<br><br>Review software design concepts before exploring two styles of testing software. | Lecture<br>Discussion<br>Exercises<br><br>Quiz | The teacher will announce assignments in class. | 200 |
| 12 / | Software Testing<br><br>Learn about testing at different stages of the development process and then practice unit testing with a programming exercise. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |
| 13 / | Waterfall vs. Agile: Testing<br><br>Learn about Test-Driven Development (TDD) and compare it to traditional testing practices. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |
| 14 / | Software Operation & Maintenance<br><br>Investigate topics in the operation & maintenance stage of the software development lifecycle. | Lecture<br>Discussion<br>Exercises | The teacher will announce assignments in class. | 200 |
| 15 / | Semester Review<br><br>Review class content, complete any unfinished assignments, and take a final quiz combining all the material from the semester. | Guidance<br>Self-Study<br>Quiz | Review for the final quiz. | 200 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Info. Elective | Programming Lab A | 2 | 550400 | First | Exercises Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | SANG-NGENCHAI, Apirak | 31-125-1 | | Wed. 16.30 - 17.30 |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Python<br>2 Object-Oriented Programming<br>3 Application Development<br>4<br>5 | In this course, students will acquire foundational Python programming skills, learn and apply key principles of Object-Oriented Programming (OOP), consider how to solve real-world problems using Python and OOP concepts effectively, know how to design and implement efficient, reusable, and maintainable code, and be able to create a capstone project demonstrating their proficiency in Python and OOP. |

### Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students must have 30 50-minute self-study times for 15 50-minute classes. This course will offer experiential learning in class as a type of active learning.

Course Description:
This course builds on programming concepts learned in previous programming-related classes. It introduces Python with a focus on variables, conditional statements, loops, and functions. Once students are comfortable with Python, they will explore object-oriented programming concepts such as encapsulation, abstraction, inheritance, and polymorphism. Finally, students will apply their knowledge by completing a programming project.

Expectations for Students:
Always bring your laptop and charger to class but keep them closed until the teacher instructs you to open them. If you are having trouble keeping up in class, please schedule a meeting with the teacher for assistance.

### Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books: "Python Crash Course, 3rd Edition" (No Starch Press) ISBN-13: 978-1718502703
Reserved books:

### Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Students must have a foundational understanding of Python programming concepts, including variables, conditionals, loops, and functions, as covered in previous programming-related classes. Students should also be proficient in using programming software or editors to write and run code. Additionally, students should be capable of researching online resources to enhance their understanding of programming tools and technologies.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | h | Students will be able to develop scientific and logical thinking to analyze and solve programming language problems. |
| ② | a, i | Students will be able to discover useful and relevant resources for learning programming tools & technologies. |
| ③ | d, f | Students will be able to collaborate with others to investigate new programming skills and techniques. |
| ④ | a, h | Students will be able to create an application using object-oriented programming in Python. |
| ⑤ | e, g | Students will be able to direct themselves and apply programming skills in the development of a specialized application. |
| ⑥ | | |

## Evaluation Criteria

| Evaluation Method<br>Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 0 | 60 | 20 | 20 | 0 | 0 | 100 |
| Comprehensive Strength Criteria — Ability to capture knowledge | 0 | 0 | 15 | 5 | 10 | 0 | 0 | 30 |
| Ability to think, reason and create | 0 | 0 | 15 | 5 | 10 | 0 | 0 | 30 |
| Collaboration and leadership | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 10 |
| Announcement / Expression / Communication | 0 | 0 | 10 | 5 | 0 | 0 | 0 | 15 |
| Attitude and motivation for learning | 0 | 0 | 10 | 5 | 0 | 0 | 0 | 15 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Reports | ① | ⌵ | Students will receive weekly exercises that relate to the material covered that week. These exercises will include all target ability-related questions.<br><br>If a student is absent, it is their responsibility to obtain the weekly exercise from the teacher. As the teacher has stated, completed weekly exercises must be submitted on time. |
| | ② | ⌵ | |
| | ③ | ⌵ | |
| | ④ | ⌵ | |
| | ⑤ | ⌵ | |
| | ⑥ | | |
| Presentations | ① | ⌵ | Students will give an oral presentation on their final project. The teacher will announce the format of the presentation in class. |
| | ② | ⌵ | |
| | ③ | | |
| | ④ | ⌵ | |
| | ⑤ | ⌵ | |
| | ⑥ | | |
| Works | ① | ⌵ | Students must submit a final programming project, which requires them to design an application, to evaluate the skills acquired in class. |
| | ② | ⌵ | |
| | ③ | ⌵ | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Develop proficiency in creating Python programs. | Students are able to understand the basic syntax of Python. |
| Construct Python code incorporating advanced elements. | Students are able to write simple Python code with conditional branches, lists, dictionaries, functions, and libraries. |
| Collaborate on projects using Python and OOP to create innovative solutions. | Students are able to implement Object-Oriented Programming concepts to design robust and efficient programs. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | - Class Guidance, <br> - Python Programming Environment Setup (Integrated Development Environment, IDE) <br> - Basic Python (Variables, Data Types) | Lecture <br> Exercise | The teacher will announce assignments in class. | 200 |
| 2 / | - Lists <br> - Conditional Branches | Lecture <br> Exercise | The teacher will announce assignments in class. | 200 |
| 3 / | - Dictionaries <br> - Input and Loops | Lecture <br> Exercise | The teacher will announce assignments in class. | 200 |
| 4 / | - Functions <br> - Classes | Lecture <br> Exercise | The teacher will announce assignments in class. | 200 |
| 5 / | - File and Exceptions <br> - Data Visualization | Lecture <br> Exercise | The teacher will announce assignments in class. | 200 |
| 6 / | - Mini Project (1) | Lecture <br> Exercise | The teacher will announce assignments in class. | 200 |
| 7 / | - Mini Project (2) | Lecture <br> Exercise | The teacher will announce assignments in class. | 200 |
| 8 / | - Object-Oriented Programming (Encapsulation) | Lecture <br> Exercise | The teacher will announce assignments in class. | 200 |
| 9 / | - Object-Oriented Programming (Abstraction) | Lecture <br> Exercise | The teacher will announce assignments in class. | 200 |
| 10 / | - Object-Oriented Programming (Polymorphism) | Lecture <br> Exercise | The teacher will announce assignments in class. | 200 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | - Object-Oriented Programming (Inheritance) | Lecture Exercise | The teacher will announce assignments in class. | 200 |
| 12 / | - Working with APIs | Lecture Exercise | The teacher will announce assignments in class. | 200 |
| 13 / | - Programming Project (1) | Lecture Exercise | The teacher will announce assignments in class. | 200 |
| 14 / | - Programming Project (2) | Lecture Exercise | Preparing for presentation | 200 |
| 15 / | - Final Presentation | Lecture Exercise | Completed project and Submission | 200 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Info. Elective | Programming Lab B | 2 | 550500 | Second | Exercises Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | OGAWA, Hayato | KC 31-118-1 | | Thu 9:00-17:00 |

## Course Objectives

| Keywords (10.5pt) | | Learning Objectives (10.5pt) |
|---|---|---|
| 1 | Embedded systems | This course introduces students to embedded programming through hands-on microcontroller projects using either C or Python, based on prior experience. Programming the digital input/output, Interrupts, Analog to Digital conversion (ADC), PWM control, and User input and output devices. Knowledge from this course is usable in designing digital control units for consumer electronics, industrial automation, telecommunication systems, etc. |
| 2 | Microcontrollers | |
| 3 | Microprocessors | |
| 4 | Real-Time Operating Systems | |
| 5 | Python | |

## Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.
This course will offer experiential learning in class as a type of active learning

This course introduces students to the basis of a microprocessor-based computer hardware system with software that is designed to carry out computation for real-time operations. This course includes lectures, hands-on works, and an individual project. Particularly the Raspberry pi will be studied and utilized together with various microcontroller peripherals. The microcontroller peripherals boards will be built and debugged by students. Students will learn through hands-on experience while doing several experiments and projects.
Advice on taking this course:
- Have laptops or notebooks ready before class starts.
- Be sure to prepare sufficiently for class and the incoming topics in advance.
- Submit assignments on time.
At the end of the course, students will apply their knowledge to a hands-on project where they will design and build their own embedded system.

## Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:
Reference books:
Reserved books:

## Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)
Knowledge and experience learned and acquired so far

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | a,h | Students will be able to analyze issues, collect information, and identify problems. |
| ② | a,h | Students will be able to think logically based on data, facts, and truth. |
| ③ | a,h | Students will be able to connect and apply new knowledge and acquired knowledge. |
| ④ | a,h | Students will be able to explain their analysis and ideas logically, in an easy-to-understand manner. |
| ⑤ | a,h,i | Students will be able to show an attitude of trying to objectively evaluate one's ability. |
| ⑥ | | |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 0 | 50 | 0 | 50 | 0 | 0 | 100 |
| Ability to capture knowledge | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 20 |
| Ability to think, reason and create | 0 | 0 | 20 | 0 | 20 | 0 | 0 | 40 |
| Collaboration and leadership | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Announcement / Expression / Communication | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 20 |
| Attitude and motivation for learning | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 20 |

(Comprehensive Strength Criteria)

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Reports | ① ✓ | Exercises will be done on every topic. The exercises should be finished by the next class. |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ ✓ | |
| | ⑥ | |
| Presentations | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Works | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Portfolios | ① ✓ | Students will involve a lot of hands-on exercises starting with programming and establishing a connection to microcontroller peripherals boards. There is a final project in which each student will need to design an application that combines two or more basic functions. |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ ✓ | |
| | ⑥ | |
| Others | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Students are able to understand and explain the concept of a microprocessor-based computer hardware system for real-time operations with a correct schematic diagram. | Students are able to understand the concept of a microprocessor-based computer hardware system for real-time operations correctly. |
| Students are able to perform and improvise the learned basic operation of the microcontroller using a programming language. | Students are able to perform the learned basic operation of the microcontroller using a programming language. |
| Students are able to design an application that utilizes more than three basic operations together. | Students are able to design an application that utilizes at least three basic operations together. |
| Collaborative Learning: Work collaboratively on projects and labs, and participate in peer learning activities. assignments. | Collaboration: Skills in working effectively in teams, demonstrating flexibility, |

## Course Schedule

\* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Guidance<br><br>Introduction to microprocessor-based computer hardware system, peripherals boards and Python programming environment. | Lecture | Read the given lecture slides. | 200 |
| 2 / | Programming of digital input/output | Lecture<br>Exercise | Read the given tutorial and proceed with exercises. | 200 |
| 3 / | Programming of digital input/output (continue) | Exercise | Read the given tutorial and proceed with exercises. | 200 |
| 4 / | Programming for Pulse Width Modulation (PWM) control | Lecture<br>Exercise | Read the given tutorial and proceed with exercises. | 200 |
| 5 / | Programming for PWM control (continue) | Exercise | Read the given tutorial and proceed with exercises. | 200 |
| 6 / | Programming for Analog to Digital conversion. | Lecture<br>Exercise | Read the given tutorial and proceed with exercises. | 200 |
| 7 / | Programming for Analog to Digital conversion (continue). | Exercise | Read the given tutorial and proceed with exercises. | 200 |
| 8 / | Programming for Motor & Driver | Lecture<br>Exercise | Read the given tutorial and proceed with exercises. | 200 |
| 9 / | Programming for 4-Digit 7-Segment Display. | Lecture<br>Exercise | Read the given tutorial and proceed with exercises. | 200 |
| 10 / | Programing for the LED Matrix. | Lecture<br>Exercise | Read the given tutorial and proceed with exercises. | 200 |

## Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Programing for the LCD. | Lecture Exercise | Read the given tutorial and proceed with exercises. | 200 |
| 12 / | Final Project (1)<br><br>Understanding a final project and choosing electronic elements for own project. | Lecture Exercise | Read the given tutorial and proceed with self-project. | 200 |
| 13 / | Final Project (2)<br><br>Continuing to work on self-project for a raspberry pi electronic project. | Exercise | Read the given tutorial and proceed with self-project. | 200 |
| 14 / | Final Project (3)<br><br>Continuing to work on self-project for a raspberry pi electronic project. | Exercise | Read the given tutorial and proceed with self-project. | 200 |
| 15 / | Final Project (4)<br><br>Continuing to work on self-project for a raspberry pi electronic project. | Exercise | Read the given tutorial and proceed with self-project. | 200 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Info. Required * Practical | Introduction to Management | 2 | 551500 | First | Lecture/ Total |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 4 | *MEBUSAYA, Tossa / MEBUSAYA, Rattiya | Kanazawa C: 31.114-2 | | Make an appointment in class |

## Course Objectives

| Keywords (10.5pt) | Learning Objectives (10.5pt) |
|---|---|
| 1 Management principles<br>2 Organizations and team<br>3 Decision Making<br>4 Planning and Goal<br>5 Change and Innovation | This is an introductory course on basic management concepts, principles and practices to acquire knowledge and skills for solving problems systematically and methodically. Students will be able to learn:<br>1) Management principles and functions,<br>2) Managing people and communication, and organizations,<br>3) Managing strategy, changes and innovation. |

### Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes. This course will offer problem-solving learning, investigative learning, and group discussion in class as a type of active learning. The course deals with the essential topics of "management" according to the textbook, so students should read it carefully before attending each class. This course consists of lectures and active learning activities such as class discussions, individual/group work and presentations from students. The active learning activities of this course will help students extend their own organizational, communicational, managerial, and leadership skills, and enable them to successfully solve complex organizational problems. This course will deal with a wide range of concepts and materials of management, which involve broad examples and case studies providing insight and meaningful information. Students will be able to apply what they learn on a practical level and to succeed in their career/business. Be ready to discuss and ask questions about the course content. The instructor also expects students to focus on the class – cell phones should be put away, and laptops/tablets should be used for course-related work only. Please be respectful toward everyone in the class.

Relationship between this course and business experiences

The instructor brings working experiences as a team member, a business owner, and as Startup co-founder and coaching – from various organizations that operate in US, Canada and countries around Asia.

### Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: None
Reference books: Colin Combe, (2014). *Introduction to Management*, Oxford University Press. ISBN: 9780199642991
Reserved books: None

### Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Ability to communicate in English, especially reading skills in English. You should preview materials or reading articles that are occasionally given prior each class. Hopefully, you are a bit curious about what you will be learning, have some questions in your mind and will be able to fit what you read into a bigger context of where it fits into the whole class.

| No. | Program Objectives | Target Abilities for Students (9pt) |
|---|---|---|
| ① | a,b,i | Students will be able to understand what management is and why it is important. |
| ② | d,e,f | Students will be able to identify the functions of management in organisations. |
| ③ | b,g | Students will be able to discuss the components of a strategic plan. |
| ④ | b,g | Students will be able to outline the steps of the decision-making process. |
| ⑤ | c,d,e,f | Students will be able to evaluate effective team development and leadership. |
| ⑥ | a,g,h | Students will be able to consider the current business landscape and trends. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 0 | 50 | 30 | 10 | 0 | 10 | 100 |
| Ability to capture knowledge | 0 | 0 | 15 | 10 | 0 | 0 | 0 | 25 |
| Ability to think, reason and create | 0 | 0 | 15 | 15 | 5 | 0 | 0 | 35 |
| Collaboration and leadership | 0 | 0 | 15 | 0 | 0 | 0 | 5 | 20 |
| Announcement / Expression / Communication | 0 | 0 | 5 | 5 | 5 | 0 | 0 | 15 |
| Attitude and motivation for learning | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |

(Comprehensive Strength Criteria)

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | | Evaluation Methods and Important Points (10.5pt) |
|---|---|---|---|
| Exams | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Quizzes | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Reports | ① | ✔ | Reports will include either individual or group reflections about some topics, and personal reflection on own learning experience. The format of the report will be announced by the instructor.<br>- Class/chapter summary report<br>- Research report |
| | ② | ✔ | |
| | ③ | ✔ | |
| | ④ | ✔ | |
| | ⑤ | ✔ | |
| | ⑥ | ✔ | |
| Presentations | ① | ✔ | Presentation will include either individual or group reflections about some topics, and personal reflection on own learning experience. The format of the presentation will be announced by the instructor. |
| | ② | ✔ | |
| | ③ | ✔ | |
| | ④ | ✔ | |
| | ⑤ | ✔ | |
| | ⑥ | ✔ | |
| Works | ① | ✔ | Class discussion. Able to share and elaborate your ideas and viewpoints to the class. Be able to accept and be open to other's opinions. Able to form mutual understanding and decision. |
| | ② | ✔ | |
| | ③ | ✔ | |
| | ④ | ✔ | |
| | ⑤ | ✔ | |
| | ⑥ | ✔ | |
| Portfolios | ① | | |
| | ② | | |
| | ③ | | |
| | ④ | | |
| | ⑤ | | |
| | ⑥ | | |
| Others | ① | ✔ | Learning attitude, motivation for learning during class. Be respectful. |
| | ② | | |
| | ③ | ✔ | |
| | ④ | ✔ | |
| | ⑤ | ✔ | |
| | ⑥ | | |

Specific Achievement Criteria

| Description of Ideal Achievement (10.5pt) | Description of Standard Achievement (10.5pt) |
|---|---|
| Students can understand what management is and why it is important.<br>Students can identify the functions of management in organisations.<br>Students can discuss the components of a strategic plan.<br>Students can outline the steps of the decision-making process.<br>Students can evaluate effective team development and leadership.<br>Students can consider the current business landscape and trends. | Students can understand what management is.<br>Students can understand some functions of management in organisations.<br>Students can understand some components of a strategic plan.<br>Students can understand the decision-making process.<br>Students can understand the role of team and leadership.<br>Students can be aware of the current business landscape and trends. |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 / | Class Introduction<br><br>Introduction to Management | Lecture & Active Learning | Read the syllabus.<br><br>Chapter summary and/or study given materials. | 100<br><br>200 |
| 2 / | Management Theory | Lecture & Active Learning | Chapter summary and/or study given materials. | 200 |
| 3 / | Planning | Lecture & Active Learning | Chapter summary and/or study given materials.<br><br>Report 01. | 200<br><br>100 |
| 4 / | Organising | Lecture & Active Learning | Chapter summary and/or study given materials. | 200 |
| 5 / | Leading | Lecture & Active Learning | Chapter summary and/or study given materials. | 200<br><br>100 |
| 6 / | Controlling | Lecture & Active Learning | Chapter summary and/or study given materials.<br><br>Report 02. | 200 |
| 7 / | Decision Making | Lecture & Active Learning | Chapter summary and/or study given materials. | 200 |
| 8 / | Human Resource Management Motivation and Communications | Lecture & Active Learning | Chapter summary and/or study given materials. | 200<br><br>100 |
| 9 / | Managing Groups and Teams | Lecture & Active Learning | Chapter summary and/or study given materials.<br><br>Report 03. | 200 |
| 10 / | Organisational Structure & Organisational Culture | Lecture & Active Learning | Chapter summary and/or study given materials. | 200<br><br>100 |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content (10pt) | Method (10pt) | Assignments (10pt) (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 11 / | Ethics and Corporate Social Responsibility | Lecture & Active Learning | Chapter summary and/or study given materials. | 200 |
| 12 / | Strategic Management | Lecture & Active Learning | Chapter summary and/or study given materials. <br><br> Report 04. | 200 <br><br> 100 |
| 13 / | Marketing | Lecture & Active Learning | Chapter summary and/or study given materials. <br><br> Prepare for presentation. | 200 <br><br> 100 |
| 14 / | Change Management and Innovation | Lecture & Active Learning | Chapter summary and/or study given materials. <br><br> Prepare for presentation. | 200 <br><br> 100 |
| 15 / | Final Presentation: Students will present what was learnt in this course or related topics, reflect on their future | Lecture & Active Learning | | 300 |

# 2025 Syllabus

| Field | Course Name | Credits | Course Code | Semester | Class Style |
|---|---|---|---|---|---|
| Dept. S Specialized Required | Mathematical Engineering | 4 | 521200 | All year | Lecture Class |

| Target Grade | Instructor | Office | E-mail Address | Office Hours |
|---|---|---|---|---|
| 3 | HUSSIEN, Alaa / EVANS, Davis | Kanazawa C 31.309 | | Friday 16:30-17:30 |

## Course Objectives

| Keywords | Learning Objectives |
|---|---|
| 1 Differentiation<br>2 Matrices<br>3 Laplace transform<br>4 Integration<br>5 Differential Equations | To enable students to apply general mathematical principles and equip them with appropriate engineering mathematical skills to solve engineering problems |

## Course Description and Expectations for Students

At the successful completion of this course, students will be able to:
1. Apply techniques of algebra to solve engineering-related problems
2. Apply matrices to solve engineering-related problems
3. Apply techniques of calculus including integration and differential equations to solve engineering-related problems.
4. The lecture style of this course is conducted through a discussion and Q&A between the teacher and students in order to get them involved in to the class. In addition, students help each other through peer learning during the work sheet solving time. These are two types of the active learning applied in the class.

From week#1 to week#15 (Davis Evans-Alaa Hussien)
From week#16 to week#30 (Alaa Hussien)

Required Materials (textbooks, reference books, reserved books)
 Textbooks: None:
 Reference books: None
 Reserved books:  None

## Knowledge/Skills Needed to Take This Course (Prerequisites)

Fundamental understanding of Algebra and Trigonometry

| No. | Program Objectives | Target Abilities for Students |
|---|---|---|
| ① | e | Students will be able to solve engineering problems using algebra. |
| ② | e | Students will be able to perform basic matrix mathematics and use them for real-life applications |
| ③ | e | Students will be able to use Laplace transformations |
| ④ | e | Students will be able to solve simple math problems using differentiation. |
| ⑤ | e | Students will be able to solve simple math problems using integration. |
| ⑥ | e | Students will be able to create simple mathematical models to model engineering systems. |

## Evaluation Criteria

| Evaluation Method / Criteria and Ratio | Exams | Quizzes | Reports | Presentations | Works | Portfolios | Others | Total |
|---|---|---|---|---|---|---|---|---|
| Total Evaluation Ratio | 0 | 60 | 25 | 0 | 0 | 15 | 0 | 100 |
| Ability to capture knowledge | 0 | 30 | 10 | 0 | 0 | 5 | 0 | 45 |
| Ability to think, reason and create | 0 | 30 | 5 | 0 | 0 | 0 | 0 | 35 |
| Collaboration and leadership | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| Announcement / Expression / Communication | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Attitude and motivation for learning | 0 | 0 | 5 | 0 | 0 | 10 | 0 | 15 |

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

**Evaluation Method**

| Evaluation Method | Target Ability | Evaluation Methods and Important Points |
|---|---|---|
| Exams | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Quizzes | ① ✓ | There will be four quizzes to test students' comprehension and ability to apply techniques taught in this class. The first quiz will be in the 7th week and the second quiz will be in the 15th week. The third quiz will be in 22nd week and the fourth quiz will be in the last week of the year. Each quiz is worth 15% of the total score. |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ ✓ | |
| | ⑥ ✓ | |
| Reports | ① ✓ | Students will be given a worksheet every class. They will have to solve the problems and submit it by the beginning of the next class. The reports ae worth 25% of the total score. The grading criteria will be based on whether or not they checked the model answer and have corrected their mistakes completely. There will be a rubric that will determine your score. |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ ✓ | |
| | ⑥ ✓ | |
| Presentations | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Works | ① | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |
| Portfolios | ① ✓ | The portfolio aspect of the grade is meant to make sure the student is keeping up with all the daily material in a neat and organized manner. The portfolio is worth 15% of the total score. There will be a rubric that will determine your final score for your portfolio. The rubric will measure the following: 1-Notebook – Did the student take a decent amount of notes for each lecture? 5% 2-Binder – Are the papers of all sections well organized? 5% 3-Work– Did the student go back to correct mistakes in their HW/quizzes? 5% |
| | ② ✓ | |
| | ③ ✓ | |
| | ④ ✓ | |
| | ⑤ ✓ | |
| | ⑥ ✓ | |
| Others | ① ✓ | |
| | ② | |
| | ③ | |
| | ④ | |
| | ⑤ | |
| | ⑥ | |

Specific Achievement Criteria

| Description of Ideal Achievement | Description of Standard Achievement |
|---|---|
| Be able to understand the mathematics topics such as differentiation and integration and use them to solve complicated real-life application | Be able to understand the mathematics topics such as differentiation and integration and use them to solve simple real-life application |

# Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

| Class No. Date | Class Content | Method | Assignments (Preview and Review) | Time (Minutes) |
|---|---|---|---|---|
| 1 ~ 2 / | Differential Calculus Definition, differentiation of basic Functions. | Lecture Worksheet | Review course notes | 40 |
| 3 ~ 4 / | Differential Calculus Product, quotient and chain rule. Turning points, 2nd derivative test. | Lecture Worksheet | Review course notes | 40 |
| 5 ~ 6 / | Differential Calculus Optimization | Lecture Worksheet | Review course notes | 40 |
| 7 ~ 8 / | Differential Calculus Parametric differentiation. | Lecture Worksheet | Review course notes | 40 |
| 9 ~ 10 / | Differential Calculus Implicit differentiation. | Lecture Worksheet | Review course notes | 40 |
| 11 ~ 12 / | Differential Calculus Application–radius & center of Curvature | Lecture Worksheet | Review course notes | 40 |
| 13 ~ 14 / | Review lecture Qui z#1 | Q&A session Quiz | Prepare for the Quiz | 40 |
| 15 ~ 16 / | Integral Calculus Integration of basic functions. Linear function rule. | Lecture Worksheet | Review course notes | 40 |
| 17 ~ 18 / | Integral Calculus Substitution method. | Lecture Worksheet | Review course notes | 40 |
| 19 ~ 20 / | Integral Calculus Integration by parts. Trig Integrals | Lecture Worksheet | Review course notes | 40 |
| 21 ~ 22 / | Integral Calculus Partial fractions. | Lecture Worksheet | Review course notes | 40 |

| Class No.<br>Date | Class Content | Method | Assignments<br>(Preview and Review) | Time<br>(Min) |
|---|---|---|---|---|
| 23<br>~<br>24<br>/ | Integral Calculus<br>The definite integral, areas under<br>and between curves. | Lecture<br>Worksheet | Review course notes | 40 |
| 25<br>~<br>26<br>/ | Integration Applications<br>Lengths, areas of revolution | Lecture<br>Worksheet | Review course notes | 40 |
| 27<br>~<br>28<br>/ | Integration Applications<br>Volumes & centroids | Lecture<br>Worksheet | Review course notes<br>Study for the exam | 100 |
| 29<br>/<br>30 | Review lecture<br>Quiz #2 | Q&A session<br>Quiz | Study for the quiz | 100 |
| 31<br>~<br>32<br>/ | Linear Algebra<br>Systems of equations two-variables and several -<br>variables-Gaussian elimination | Lecture<br>Worksheet | Review course notes | 40 |
| 33<br>~<br>34<br>/ | Linear Algebra<br>Matrix definitions<br>REF and RREF methods | Lecture<br>Worksheet | Review course notes | 40 |
| 35<br>~<br>36<br>/ | Linear Algebra<br>Matrix Algebra<br>Matrix Inverse | Lecture<br>Worksheet | Review course notes | 40 |
| 37<br>~<br>38<br>/ | Linear Algebra<br>Determinants<br>Cramer Rule | Lecture<br>Worksheet | Review course notes | 40 |
| 39<br>~<br>40<br>/ | Linear Algebra<br>Matrices<br>Engineering Applications | Lecture<br>Worksheet | Review course notes | 40 |
| 41<br>~<br>42<br>/ | Linear Algebra<br>Matrices<br>Engineering Applications | Lecture<br>Worksheet | Review course notes | 40 |
| 43<br>~<br>44<br>/ | Review lecture<br>Quiz #3 | Q&A session<br>Quiz | Prepare for the Quiz | 40 |

| Class No.<br>Date | Class Content | Method | Assignments<br>(Preview and Review) | Time<br>(Min) |
|---|---|---|---|---|
| 45<br>~<br>46<br>/ | Laplace transform-definition<br>Laplace transform of basic functions | Lecture<br>Worksheet | Review course notes | 40 |
| 47<br>~<br>48<br>/ | Inverse Laplace transform<br>Engineering Applications | Lecture<br>Worksheet | Review course notes | 40 |
| 49<br>~<br>50<br>/ | Differential Equations<br>Introduction. Direct differential<br>equations, separable and<br>Homogeneous DE's. | Lecture<br>Worksheet | Review course notes | 40 |
| 51<br>~<br>52<br>/ | Differential Equations<br>1st order linear DE's<br>Differential Equations<br>2nd order linear DE's | Lecture<br>Worksheet | Review course notes | 40 |
| 53<br>~<br>54<br>/ | Differential Equations<br>Engineering Applications | Lecture<br>Worksheet | Review course notes | 40 |
| 55<br>~<br>56<br>/ | Differential Equations<br>Engineering Applications | Lecture<br>Worksheet | Review course notes | 40 |
| 57<br>~<br>58 | Introduction to Fourier series | Lecture<br>Worksheet | Review course notes | 100 |
| 59<br>~<br>60 | Review<br>Quiz #4 | Q&A session<br>Quiz | Study for the quiz | 100 |