# Course Description Form

**1. Course Name:**

Hydraulic System and Equipments

**2. Course Code:**

HYSE477

**3. Semester / Year:**

first semester 2024-2025

**4. Description Preparation Date:**

1/2/2025

**5. Available Attendance Forms:**

Combined (Attendance + distance education)

**6. Number of Credit Hours (Total) / Number of Units (Total)**

30 theoretical hours +45 practical hours =75 hours / 3.5 Units

**7. Course administrator's name (mention all, if more than one name)**

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Amar Waeel

**8. Course Objectives**

1- Identify hydraulic systems, their types, and their uses in the field of agricultural machinery
2- Identify the basic hydraulic systems and their main functions, identify their malfunctions, and how to calibrate them.
3- Identify the advantages and disadvantages of hydraulic systems of various types
4- Identify the correct operational methods for each type of hydraulic system
5- Acquiring knowledge in methods of sustaining, maintaining and repairing parts of basic hydraulic systems.
6- Gaining the ability to keep pace with developments in hydraulic systems represented by adopting modern methods.
7- Acquire knowledge and ability in how to develop the hydraulic systems used and prove their efficiency when applied.
8- Acquiring knowledge in the applications of types of hydraulic systems in various agricultural and heavy machinery.
9- The ability to diagnose hydraulic system malfunctions
10 - Possibility of calibrating parts of the hydraulic system
11- How to choose the appropriate systems according to the variables in the crisis
12- Gaining skill in using modern hydraulic systems.
13- The ability to design and manufacture hydraulic systems to serve and develop the mechanized sector

**9. Teaching and Learning Strategies**

1-Interactive lecture
2-Brainstorming
3-Dialogue and discussion
4-Field Training

5-Practical exercises
6-Field project
7-Self-education

## 10. Course Structure

| Week | Hours | Required Learning Outcomes | Unit or subject name | Learning method | Evaluation method |
|---|---|---|---|---|---|
| 1 | 2 theoretical | a2 understands pascal's rule law<br>a1 knows hydraulic basics | Introduction to hydraulic fundamentals and derivation of Pascal's rule law | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1<br>Semester test1<br>Final test |
| | 3 Practical | c3 apply and experiment with what you hav learned about pascal's rule | Practical applications and experiments on Pascal's rule | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1<br>Semester test1<br>Final test |
| 2 | 2 theoretical | a2 understands the components of the hydraulic system<br>a2 knows what distributors and command and control systems are | Hydraulic system components, distributors, command and control systems | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1<br>Semester test1<br>Final test |
| | 3 Practical | c3 applies and experiments what he has learned about hydraulic distributors and control systems | Practical applications and experiment Distributors and hydraulic control systems | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1<br>Semester test1<br>Final test |
| 3 | 2 theoretical | a2 understands the types of hydraulic fluids<br>a2 and knows its specifications and uses | Types of hydraulic fluids, their specifications and uses | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1<br>Semester test1<br>Final test |
| | 3 Practical | c3 apply and experiment with what you have learned about hydraulic fluids | Practical applications and experiments on Hydraulic fluids | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1<br>Semester test1<br>Final test |
| 4 | 2 theoretical | a2 understands what hydraulic motors are and their uses<br>a2 defines and classifies its types | Definition and classification of types<br>Hydraulic motors and their uses | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1<br>Semester test1<br>Final test |
| | 3 Practical | c3 apply and experiment with what you have learned about hydraulic motors | Practical applications and experiments on Hydraulic motors | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1<br>Semester test1<br>Final test |

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| 5 | 2 theoretical | a2 understands what hydraulic pumps are<br>a2 defines the types, parts, and mechanism of action | Definition and classification of hydraulic pumps (Types_parts_mechanism of action) | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short d<br>Semester<br>Final test |
| | 3 Practical | c3 apply and experiment with what you have learned about hydraulic pumps | Practical applications and experiments on Hydraulic pumps | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1<br>Semester test1<br>Final test |
| 6 | 2 theoretical | a2 understands what hydraulic valves are<br>a2 defines the types, parts, and mechanism of action | Definition and classification of types Hydraulic valves (Types_parts_mechanism of action) | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1<br>Semester test1<br>Final test |
| | 3 Practical | c3 apply and experiment with what you have learned about hydraulic valves | Practical applications and experiments on Hydraulic valves | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1<br>Semester test1<br>Final test |
| 7 | 2 theoretical | a2 understands what hydraulic cylinders are<br>a2 defines the types used in agricultural machinery | Definition and classification of hydraulic cylinders and examples in Cylinders used in agricultural machinery | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1<br>Semester test1<br>Final test |
| | 3 Practical | c3 apply and experiment with what you have learned about hydraulic cylinders | Practical applications and experiments on hydraulic cylinders | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1<br>Semester test1<br>Final test |
| 8 | 2 theoretical | a2 understands what hydraulic torque converters are<br>c1 and calculate the moments transferred through it | Hydraulic moment converters and mathematical questions about them | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1<br>Semester test1<br>Final test |
| | 3 Practical | c3 applies and experiments what he has learned about hydraulic torque converters | Practical applications and experiments on hydraulic torque converters | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1<br>Semester test1<br>Final test |
| 9 | 2 theoretical | a2 understands what oil tanks, oil coolers and hydraulic isolators are | Oil tank, oil coolers and hydraulic isolators | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1<br>Semester test1<br>Final test |
| | 3 Practical | c3 apply and experiment with what you have learned about the oil tank, oil coolers and hydraulic isolators | Practical applications and experiments on oil tanks, oil coolers and hydraulic insulators | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1<br>Semester test1<br>Final test |
| 10 | 2 theoretical | a2 understands the meaning of open hydraulic system | Hydraulic systems (open system, types and features) | Interactive lecture, brainstorming, | Short daily test1<br>Semester test1 |

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| | | a1 and knows its types and features | | dialogue and discussion, self-learning | Final te |
| | 3 Practical | c3 apply and experiment with what you have learned about the open hydraulic system | Practical applications and experiments on Open hydraulic system | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily te Semester test1 Final test |
| 11 | 2 theoretical | a2 understands the meaning of a closed hydraulic system a1 and knows its types and features | Types of hydraulic systems (Closed system, its types and advantages) | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1 Semester test1 Final test |
| | 3 Practical | c3 apply and experiment with what you have learned about the closed hydraulic system | Practical applications and experiments on Closed hydraulic system | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1 Semester test1 Final test |
| 12 | 2 theoretical | a2 understands hydraulic systems in agricultural machinery a1 knows how to use it | Use of hydraulic systems in agricultural machinery | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1 Semester test1 Final test |
| | 3 Practical | c3 apply and experiment with what you have learned about hydraulic systems in agricultural machinery | Practical applications and experiments on hydraulic systems in agricultural machinery | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1 Semester test1 Final test |
| 13 | 2 theoretical | a2 understands hydraulic systems in heavy equipment a1 knows how to use it | Use of hydraulic systems in heavy equipment | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1 Semester test1 Final test |
| | 3 Practical | c3 apply and experiment with what you have learned about hydraulic systems in heavy equipment | Practical applications and experiments on Hydraulic systems in heavy equipment | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1 Semester test1 Final test |
| 14 | 2 theoretical | a2 understands the laws and mathematical calculations of hydraulic systems | Mathematical basics about Hydraulic systems | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1 Semester test1 Final test |
| | 3 Practical | a3 calculates and c1 solves various mathematical exercises and problems about hydraulic systems | Exercises for Hydraulic systems | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily test1 Semester test1 Final test |
| 15 | 2 theoretical | a2 understands the meaning and how to maintain and maintain equipment hydraulic | Maintenance and maintenance of equipment Hydraulic | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short daily test1 Semester test1 Final test |

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| | | a2 knows how to maintain and maintain | | | |
| | 3 Practical | C3 Applies and experiments with what he has learned about maintaining and maintaining hydraulic equipment | Practical applications and experiments on maintaining an sustaining hydraulic equipment | Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning | Short daily t Semester test Final test |

## 10. Course Evaluation

| Seq. | Evaluating style | date | marks | Relative weight |
|---|---|---|---|---|
| 1 | Home reports | every week | 10 | 10% |
| 2 | Short tests | every week | 10 | 10% |
| 3 | Semester test 1 | The seventh week | 10 | 10% |
| 4 | Semester test 2 | The final week | 10 | 10% |
| 5 | Final practical test | End of the course | 20 | 20% |
| 6 | Final theoretical test | End of the course | 40 | 40% |
| | the total | | 100 | 100% |

## 11. Learning and Teaching Resources

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| Required textbooks (curricular books, if any) | |
| Main references (sources) | 1- أسس تصميم وصيانة النظم الهيدروليكية . محمد شيخو معمو.شعاع للنشر والعلوم 2009<br>2- أسس الآلات الهيدروليكية (تقنية آلات زراعية) . المؤسسة العامة للتعليم الفني والتدريب المهني<br>3- هيدروليكية المكائن الزراعية. عبدالجبارخلف الجميلي وعبدالعزيز عباس عزيز1992<br>4- التحكم الهيدروليكي وتطبيقاته . أحمد عبدالمتعال .دار النشر للجامعات 1997 |
| Recommended books and references (scientific journals, reports...) | 1- Hydraulic Basics - technique of Agricultural Equipments, General Institution for technical training, 2007, 2st Addition, SAK Publisher , Press in 2007<br>2- Hydraulic Basics - technique of Agricultural Equipments, General Institution for technical training, 2007,1 st Addition, SAK Publisher , Press in 2007<br>3- Hydraulic Basics - technique of Agricultural Equipments, General Institution for technical training, 2007, 2st Addition, SAK Publisher , Press in 2007<br>4- Hydraulic Basics - technique of Agricultural Equipments, General Institution for technical training, 2007,1 st Addition, SAK Publisher , Press in 2007 |
| Electronic References, Websites | https://www.youtube.com |

مدرس المادة العملي
م.م.عمار وائل

مدرس المادة النظري
م.أحمد محمدأمين سعيد

رئيس قسم المكائن والآلات الزراعية
أ.م.نوفل عيسى محيميد

رئيس اللجنة العلمية
أ.د. عادل أحمد عبدالله