CE 483

Foundation Engineering

2nd Semester 1447 H

INSTRUCTOR

Prof. Abdullah I. Almhaidib

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TEXT BOOKS

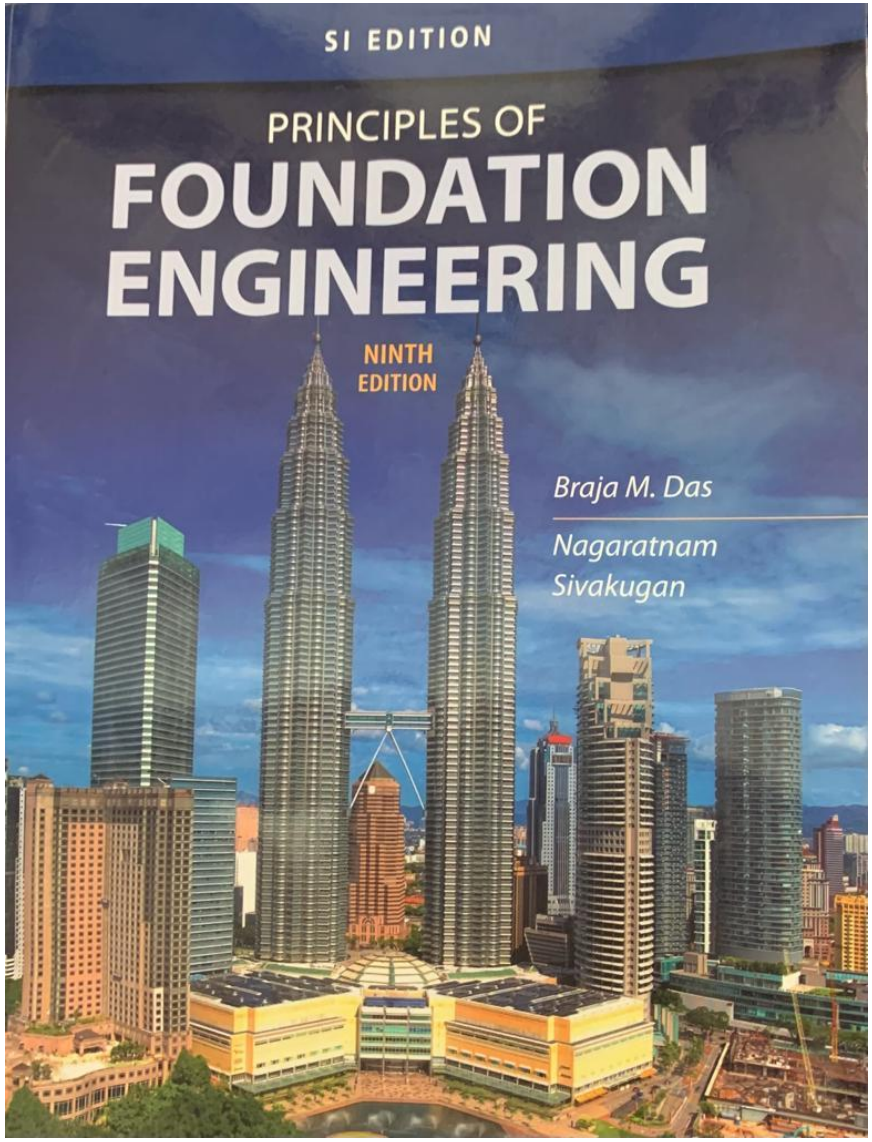
- **Text Book:**

1. Das, B. M. ***Principles of Foundation Engineering***, Latest edition

- **Supplementary References:**

1. Bowles, J. ***Foundation Analysis and Design***, Latest Edition.
2. ***The Saudi Building Code***

TEXT BOOK


SI EDITION
PRINCIPLES OF
FOUNDATION
ENGINEERING
NINTH
EDITION
Braja M. Das
Nagaratnam
Sivakugan

Course Attendance

Lectures
Tutorial
} **25% !!!!**

Electronic Attendance

Section Coordinator

Midterm Exams are Fixed

1st Exam Monday 11/10/1447 (30/03/2026) (@ 6:30 P.M.)

2nd Exam Monday 17/11/1447 (04/05/2026) (@ 7:00 P.M.)

الفصل الدراسي الثاني:

الموضوع	اليوم	هجري	ميلادي
بداية الدراسة للفصل الثاني	الأحد	29 / 07 / 1447هـ	18 / 01 / 2026 م
إجازة يوم التأسيس	الأحد	05/ 09 / 1447هـ	22 / 02 / 2026 م
بداية إجازة عيد الفطر	الأحد	19 / 09 /1447 هـ	08 /03 / 2026 م
بداية الدراسة بعد إجازة عيد الفطر	الأحد	10 /10 / 1447 هـ	29 /03 / 2026 م
آخر موعد للاعتذار عن العام الدراسي وعن مقرر (نظام سنوي)			
آخر موعد للاعتذار عن الفصل الدراسي وعن مقرر			
بداية إجازة عيد الأضحى	الأحد	07 / 12 / 1447هـ	24 / 05 / 2026 م
بداية الدراسة بعد إجازة عيد الأضحى	الثلاثاء	16 / 12 / 1447هـ	02 / 06 / 2026 م
بداية الاختبارات النهائية لمقررات الإعداد العام	الثلاثاء	16 / 12 / 1447هـ	02 / 06 / 2026 م
بداية الاختبارات النهائية	الأحد	21 / 12 / 1447هـ	07 / 06 / 2026 م
نهاية الاختبارات النهائية	الخميس	03 / 01 / 1448هـ	18 / 06 / 2026 م
بداية إجازة نهاية العام الدراسي	الأحد	06 / 01 / 1448هـ	21 / 06 / 2026 م
بداية الدراسة للعام الدراسي 1448 هـ - 2026 م	الأحد	10 /03/ 1448 هـ	23 /08/ 2026 م

COURSE GRADE DISTRIBUTION

Homework	**Weekly – (Given by TA)**	**10%**
*** 1st Midterm Exam**		**25%**
**** 2nd Midterm Exam**		**25%**
Final Exam		**40%**
Total		**100%**

*** Monday 11/10/1447 (30/03/2026) (@ 6:30 P.M.)**

**** Monday 17/11/1447 (04/05/2026) (@ 7:00 P.M.)**

GEO-ENGINEERING AT KSU

CE 382 Geotechnical Engineering I

CE 380 Soil Mechanics Laboratory

CE 481 Geotechnical Engineering II

CE 483 Foundation Engineering

Elective Courses:

- CE 484 Deep Foundations
- CE 485 Introduction to Rock Mechanics
- CE 486 Improvement of Geotechnical Engineering Materials
- CE 487 Geotechnical Engineering in Arid Regions
- CE 488 Selective Topics in Geotechnical Engineering

Postgraduate

M.Sc. : CE 581 to CE 589

Ph.D. : CE 681 to CE 689

CONTENTS

Topic	References
Geotechnical Properties of Soil (Review)	Chapter 2
Subsurface Exploration (Sec 3.11-3.29)	Chapter 3
Ultimate Bearing Capacity of Shallow Foundations	Chapter 6
Ultimate Bearing Capacity of Shallow Foundations (Special Cases)	Chapter 7
Settlement of Shallow Foundations	Chapter 9
Mat Foundations	Chapter 10
Lateral Earth Pressure	Chapter 16
Retaining Walls	Chapter 17
General Overview of Saudi Building Code for Soils and	

Chapter 2

Geotechnical Properties of Soil

CE 382 Geotechnical Engineering I

- Soil minerals
- Types of rocks
- Weathering process
- Formation of soils

- Phase relations
- Consistency limits and indices
- Classification of soils

- Soil compaction

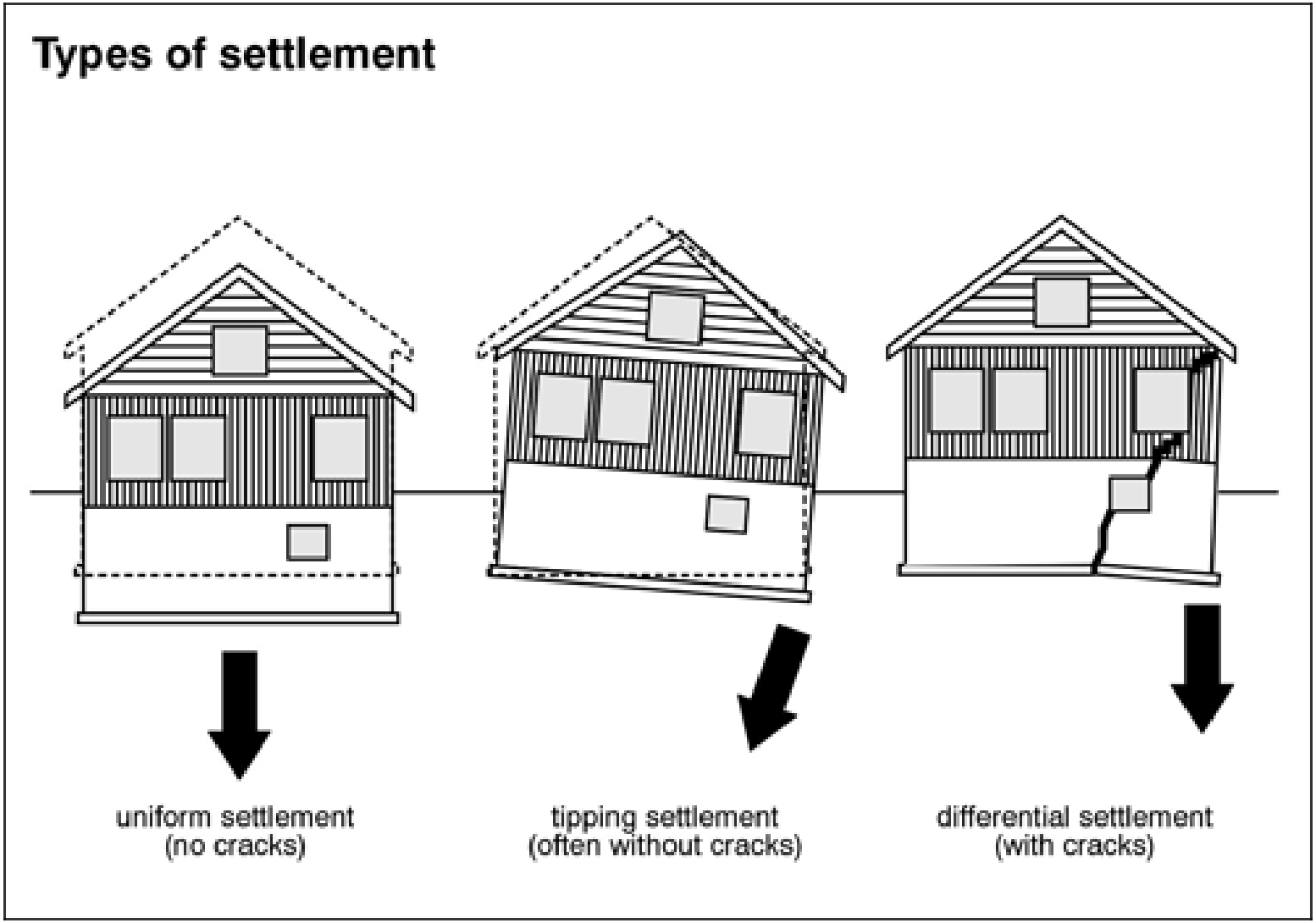
- Flow through soils (permeability and seepage)

- Principle of effective stress
- Stresses in soil masses

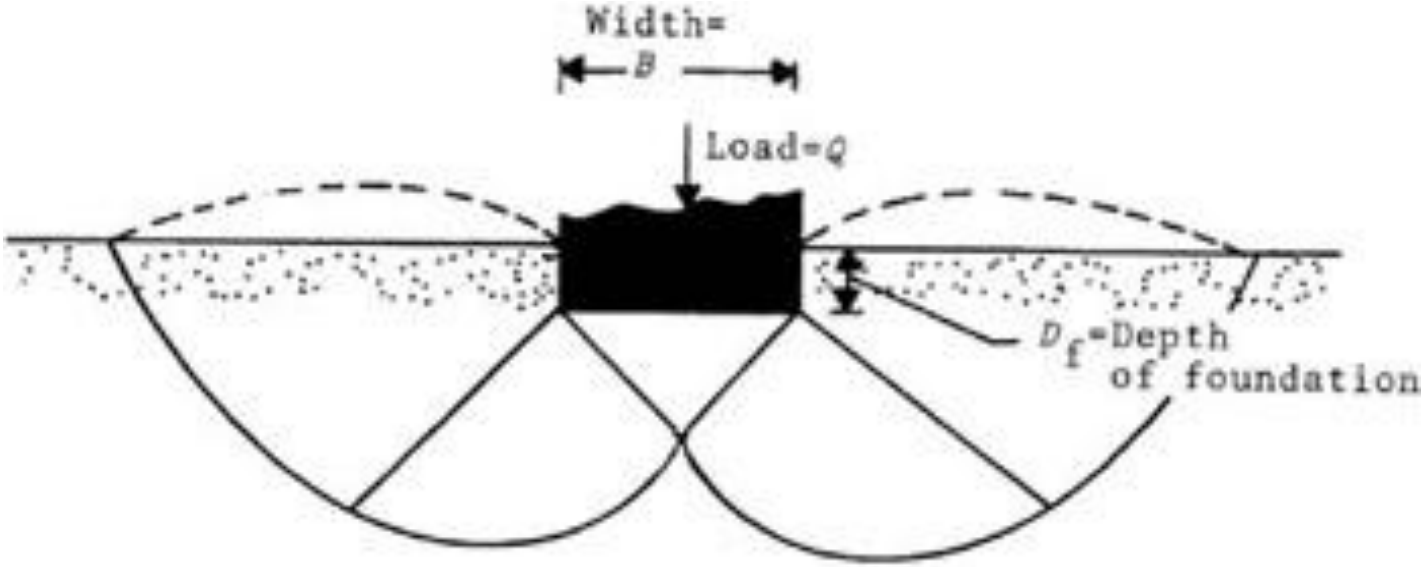
CE 481 Geotechnical Engineering II

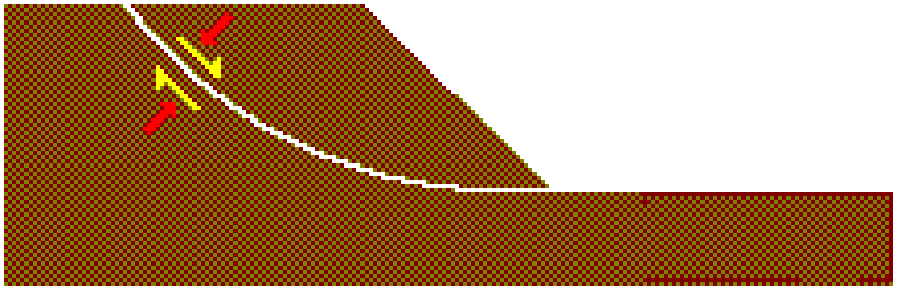
- Compressibility and Consolidation of Soil
- Shear Strength
- Slope Stability
- Lateral Earth Pressure

COMPRESSIBILITY OF SOILS

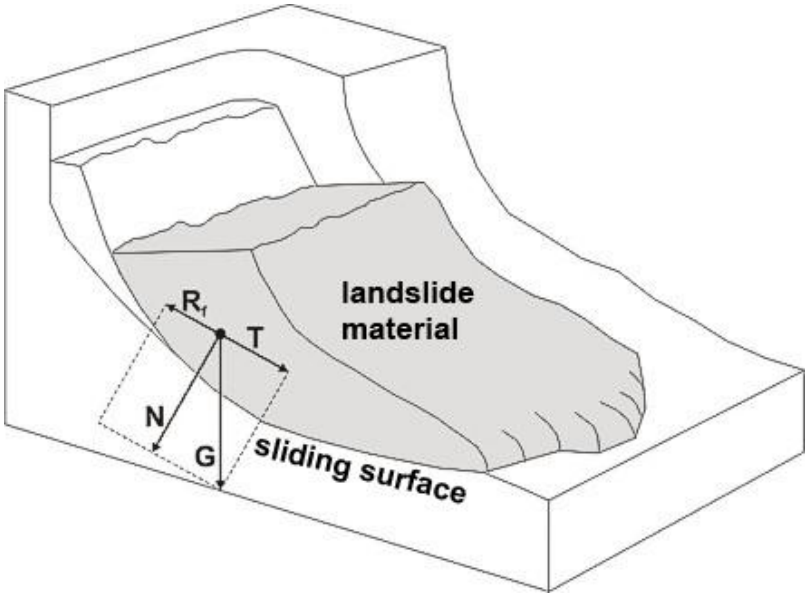


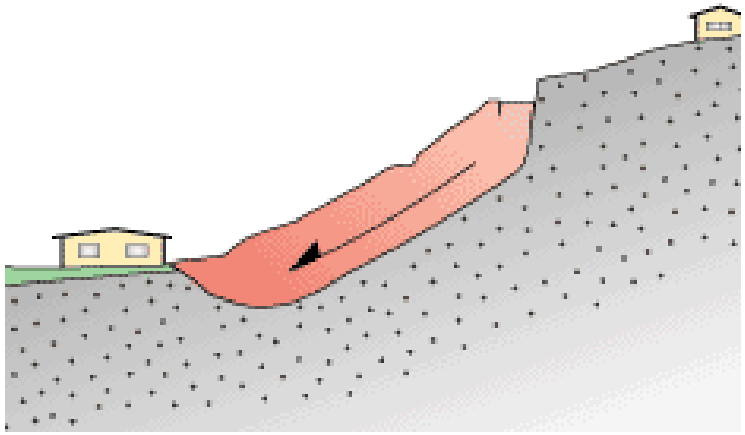
SHEAR STRENGTH OF SOIL





SLOPE STABILITY





Lateral earth pressure and Retaining Structures

FOUNDATION ENGINEERING

- In a broad sense, foundation engineering is a art of selecting, designing and constructing the elements that transfer the weight of structure to the underlying soil or rock.
- The role of engineer is to select the type of foundation, its design and supervision of construction.
- Before the engineer can design a foundation intelligently, he must have a reasonably accurate conception of the physical properties and the arrangement of the underlying materials. This requires detailed **subsurface exploration.**

FOUNDATION ENGINEER

The foundation engineer should posses the following information:

- **Knowledge of soil mechanics and background of theoretical analysis**
- **Composition of actual soil strata in the field.**
- **Necessary experience-precedents-what designs have worked well under what designs have worked well under what conditions-economic aspects**
- **Engineering JUDGMENT to find solutions to the problems.**

TYPES OF FOUNDATIONS

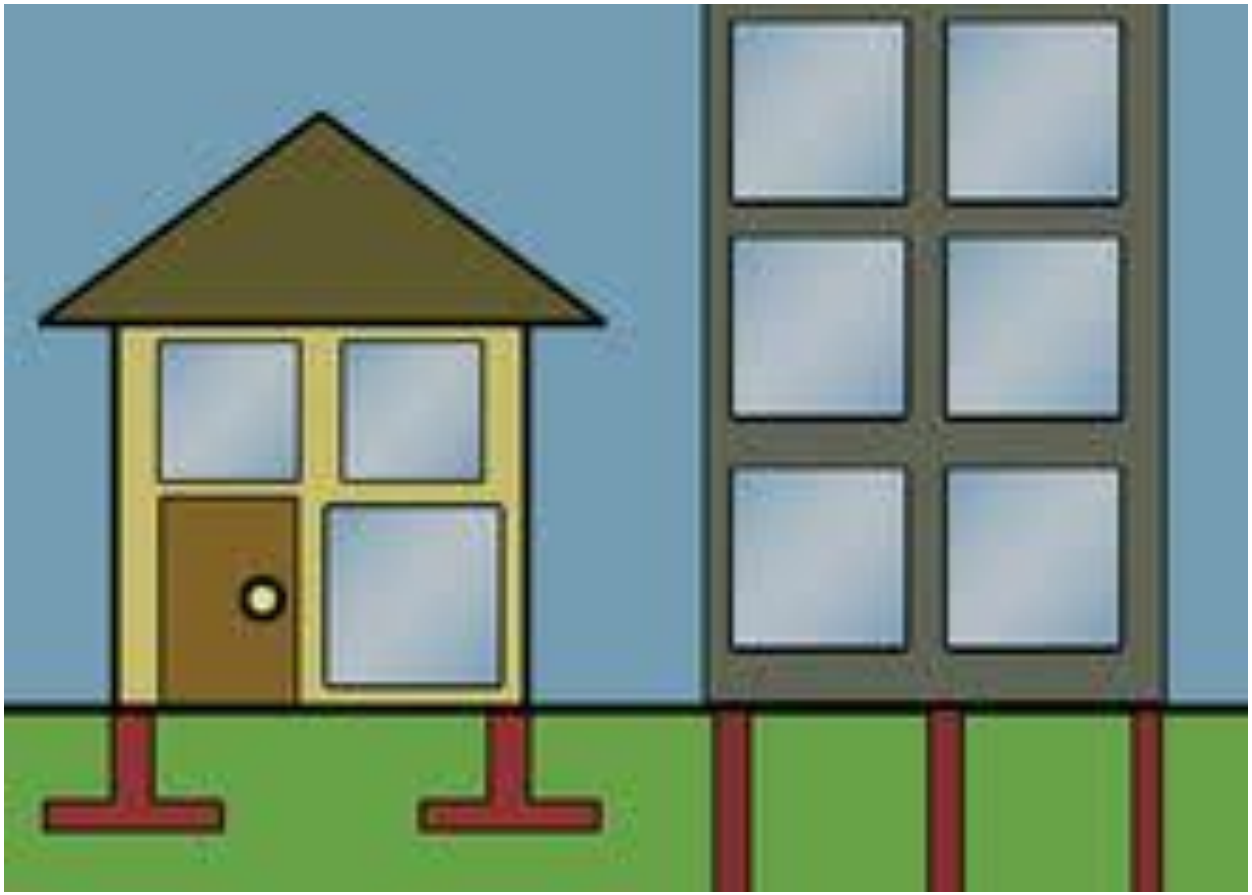
Foundations can be can be categorized into basically two types:

Shallow Foundations:

These types of foundations are placed at a shallow depth (relative to their dimensions) beneath the soil surface. Their depth may range from the top soil surface to about 3 times their breadth (about 6 meters). They include footings (spread and combined), and soil retaining structures (retaining walls, sheet piles, etc) - CE 483 Foundation Engineering.

Deep Foundations:

The most common of these types of foundations are piles. They are embedded very deep (relative to their dimensions) into the soil. Their depths may run over several 10s of meters. They are usually used when the top soil layer have low bearing capacity (CE 484 Deep Foundations).



CE 483 FOUNDATION ENGINEERING

Students completing this course successfully will be able to :

- Understand the methods of site investigations and determine the site characteristics.
- Understand the types of foundations and retaining structures.
- Understand the types of loads to be applied to foundations and retaining structures.
- Understand suitability, feasibility, and desirability of each type of foundations and retaining structure.
- Select the proper type of foundation and retaining structure according to the site and structure characteristics.
- Evaluate the settlement of the selected foundations.
- Understand and apply specification requirements.
- Use computer software to design foundations and retaining structures.
- Improve the communication skills, including reading, writing, oral presentations.