



Commission on Accreditation of Allied Health Education Programs

Standards and Guidelines for the Accreditation of Educational Programs in Orthotics and Prosthetics

Essentials/Standards initially adopted in 1993;
revised in 2001, 2006, 2010, 2017

Adopted by the
American Academy of Orthotists and Prosthetists
American Board for Certification in Orthotics, Prosthetics and Pedorthics
National Commission on Orthotic and Prosthetic Education
Commission on Accreditation of Allied Health Education Programs

The Commission on Accreditation of Allied Health Education Programs (CAAHEP) accredits programs upon the recommendation of the National Commission on Orthotic and Prosthetic Education (NCOPE).

These accreditation **Standards and Guidelines** are the minimum standards of quality used in accrediting programs that prepare individuals to enter the orthotic and prosthetic profession. Standards are the minimum requirements to which an accredited program is held accountable. Guidelines are descriptions, examples, or recommendations that elaborate on the Standards. Guidelines are not required, but can assist with interpretation of the Standards.

Standards are printed in regular typeface in outline form. *Guidelines* are printed in italic typeface in narrative form.

Preamble

The Commission on Accreditation of Allied Health Education Programs, National Commission on Orthotic and Prosthetic Education, American Academy of Orthotists and Prosthetists, and American Board for Certification in Orthotics, Prosthetics and Pedorthics cooperate to establish, maintain and promote appropriate standards of quality for educational programs in orthotics and prosthetics and to provide recognition for educational programs that meet or exceed the minimum standards outlined in these accreditation **Standards and Guidelines**. Lists of accredited programs are published for the information of students, employers, educational institutions and agencies, and the public.

These **Standards and Guidelines** are to be used for the development, evaluation, and self-analysis of orthotic and prosthetic programs. On-site review teams assist in the evaluation of a program's relative compliance with the accreditation Standards.

Description of the Profession

Orthotics and prosthetics is a specialized health care profession, which combines a unique blend of clinical and technical skills to care for patients who have neuromuscular and musculoskeletal disorders and/or patients who have a partial or total absence of a limb. Orthotists and prosthetists provide treatment that allows these individuals to lead more active and independent lives by collaborating with other members of the healthcare team. This work requires substantial clinical and technical judgment.

The principles of biomechanics, pathomechanics, gait analysis, kinesiology, anatomy and physiology are crucial to the practitioner's ability to provide comprehensive patient care and a positive clinical outcome. Patient assessment, treatment and education are part of the practitioner's responsibility and require collaborative communication skills.

In addition to performing orthotic and prosthetic procedures, the orthotist and prosthetist are involved in clinical decision-making and patient education. The scope of practice for orthotist and prosthetist includes, but is not limited to:

- Patient Assessment – Perform a comprehensive assessment of the patient to obtain an understanding of the patient's orthotic/prosthetic needs
- Formulation of the treatment plan – Create a comprehensive orthotic/prosthetic treatment plan to meet the needs and goals of the patient
- Implementation of the treatment plan – Perform the necessary procedures to deliver the appropriate orthotic/prosthetic services, which may include fabrication of the orthosis/prosthesis
- Follow-up treatment plan – Provide continuing patient care and periodic evaluation to assure/maintain/document optimal fit and function of the orthosis/prosthesis
- Practice management – Develop, implement and/or monitor policies and procedures regarding human resource management, physical environment management, business/financial management and organizational management
- Promotion of competency and enhancement of professional practice – Participate in personal and professional development through continuing education, training, research and organizational affiliations.

I. Sponsorship

A. Sponsoring Educational Institution

A sponsoring institution must be a post-secondary academic institution accredited by an institutional accrediting agency that is recognized by the U.S. Department of Education, and must be authorized under applicable law or other acceptable authority to provide a post-secondary program, which awards a minimum of a master's degree at the completion of the program.

B. Consortium Sponsor

1. A consortium sponsor is an entity consisting of two or more members that exists for the purpose of operating an educational program. In such instances, at least one of the members of the consortium must meet the requirements of a sponsoring educational institution as described in I.A.
2. The responsibilities of each member of the consortium must be clearly documented in a formal affiliation agreement or memorandum of understanding, which includes governance and lines of authority.

C. Responsibilities of Sponsor

The Sponsor must ensure that the provisions of these **Standards and Guidelines** are met.

II. Program Goals

A. Program Goals and Outcomes

There must be a written statement of the program's goals and learning domains consistent with and responsive to the demonstrated needs and expectations of the various communities of interest served by the educational program. The communities of interest that are served by the program must include, but are not limited to, students, graduates, faculty, sponsor administration, employers, physicians, and the public.

Program-specific statements of goals and learning domains provide the basis for program planning, implementation, and evaluation. Such goals and learning domains must be compatible with the mission of the sponsoring institution(s), the expectations of the communities of interest, and nationally accepted

standards of roles and functions. Goals and learning domains are based upon the substantiated needs of health care providers and employers, and the educational needs of the students served by the educational program.

B. Appropriateness of Goals and Learning Domains

The program must regularly assess its goals and learning domains. Program personnel must identify and respond to changes in the needs and/or expectations of its communities of interest.

An advisory committee, which is representative of at least each of the communities of interest named in these **Standards**, must be designated and charged with the responsibility of meeting at least annually, to assist program and sponsor personnel in formulating and periodically revising appropriate goals and learning domains, monitoring needs and expectations, and ensuring program responsiveness to change.

The meeting of the advisory committee does not necessarily have to be a face to face meeting. Meetings held by way of conference call or electronic means are acceptable. Minutes from the meeting will need to be maintained and will be reviewed during site visits.

C. Minimum Expectations

The program must have the following goal defining minimum expectations: “To prepare competent entry-level orthotists and prosthetists in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains.”

Programs adopting educational goals beyond entry-level competence must clearly delineate this intent and provide evidence that all students have achieved the basic competencies prior to entry into the field.

Nothing in this Standard restricts programs from formulating goals beyond entry-level competence.

III. Resources

A. Type and Amount

Program resources must be sufficient to ensure the achievement of the program’s goals and outcomes. Resources must include, but are not limited to: faculty; clerical and support staff; curriculum; finances; offices; classroom, laboratory, and, ancillary student facilities; clinical affiliates; equipment; supplies; computer resources; instructional reference materials, and faculty/staff continuing education.

B. Personnel

The sponsor must appoint sufficient faculty and staff with the necessary qualifications to perform the functions identified in documented job descriptions and to achieve the program’s stated goals and outcomes.

1. Program Director

a. Responsibilities

The Program Director must be responsible for all aspects of the program, including the organization, administration, continuous review, planning, development, and general effectiveness of the program.

b. Qualifications

The Program Director must:

- (1) Possess a minimum of a master’s degree;
- (2) Be credentialed in the profession of Orthotics & Prosthetics through a certification program accredited by the National Commission for Certifying Agencies (NCCA) or hold a professional license as is required by the state in which he/she is employed;
- (3) Have a minimum of five years of teaching, clinical and administrative experience in a profession related to orthotics and prosthetics.

The Program Director should pursue ongoing formal training designed to maintain and upgrade his/her professional, instructional and administrative capabilities.

2. Faculty and/or Instructional Staff

a. Responsibilities

In classrooms, laboratories, and each location where students are assigned for didactic or clinical instruction or supervised practice, there must be (a) qualified individual(s) designated to provide instruction, supervision, and timely assessments of the students' progress in achieving program requirements.

b. Qualifications

Faculty and/or Instructional Staff must:

- (1) Possess a minimum of a baccalaureate degree;
- (2) Be appropriately credentialed or licensed for the content/subject area being taught through professional preparation and experience in their respective academic areas.

The program faculty should include physicians, physical and occupational therapists, and specialists in the psychosocial areas.

C. Curriculum

The curriculum must ensure the achievement of program goals and learning domains. Instruction must be an appropriate sequence of classroom, laboratory, and clinical activities. Instruction must be based on clearly written course syllabi that include course description, course objectives, methods of evaluation, topic outline, and competencies required for graduation.

The program must demonstrate that the curriculum meets or exceeds the content of the latest edition of the *Core Curriculum for Orthotists and Prosthetists*. (Appendix B)

To accomplish the requisite integration of knowledge, theory and application of the clinical and technical aspects of the disciplines, a variety of instructional methods should be employed, including instructor presentations and demonstrations, interactive experiences, internet-based assignments, self-directed activities, structured laboratory experiences and supervised clinical experiences.

The program should consist of a minimum 60 semester credits or the equivalent.

D. Resource Assessment

The program must, at least annually, assess the appropriateness and effectiveness of the resources described in these **Standards**. The results of resource assessment must be the basis for ongoing planning and appropriate change. An action plan must be developed when deficiencies are identified in the program resources. Implementation of the action plan must be documented and results measured by ongoing resource assessment.

IV. Student and Graduate Evaluation/Assessment

A. Student Evaluation

1. Frequency and purpose

Evaluation of students must be conducted on a recurrent basis and with sufficient frequency to provide both the students and program faculty with valid and timely indications of the students' progress toward and achievement of the competencies and learning domains stated in the curriculum.

2. Documentation

Records of student evaluations must be maintained in sufficient detail to document learning progress and achievements.

B. Outcomes

1. Outcomes Assessment

The program must periodically assess its effectiveness in achieving its stated goals and learning domains. The results of this evaluation must be reflected in the review and timely revision of the program.

Outcomes assessments must include, but are not limited to: NCCA accredited national credentialing examination(s) performance, programmatic retention/attrition, graduate satisfaction, employer satisfaction, job (positive) placement, and programmatic summative measures. The program must meet the outcomes assessment thresholds.

“Positive placement” means that the graduate is employed full or part-time in a related field; and/or continuing his/her education; and/ or serving in the military.

2. Outcomes Reporting

The program must periodically submit to the NCOPE the program goal(s), learning domains, evaluation systems (including type, cut score, and appropriateness), outcomes, its analysis of the outcomes, and an appropriate action plan based on the analysis.

Programs not meeting the established thresholds must begin a dialogue with the NCOPE to develop an appropriate plan of action to respond to the identified shortcomings.

V. Fair Practices

A. Publications and Disclosure

1. Announcements, catalogs, publications, and advertising must accurately reflect the program offered.
2. At least the following must be made known to all applicants and students: the sponsor’s institutional and programmatic accreditation status as well as the name, mailing address, web site address, and phone number of the accrediting agencies; admissions policies and practices, including technical standards (when used); policies on advanced placement, transfer of credits, and credits for experiential learning; number of credits required for completion of the program; tuition/fees and other costs required to complete the program; policies and processes for withdrawal and for refunds of tuition/fees.
3. At least the following must be made known to all students: academic calendar, student grievance procedure, criteria for successful completion of each segment of the curriculum and for graduation, and policies and processes by which students may perform clinical work while enrolled in the program.
4. The sponsor must maintain, and make available to the public, current and consistent summary information about student/graduate achievement that includes the results of one or more of the outcomes assessments required in these Standards.

The sponsor should develop a suitable means of communicating to the communities of interest the achievement of students/graduates (e.g. through a website or electronic or printed documents).

B. Lawful and Non-discriminatory Practices

All activities associated with the program, including student and faculty recruitment, student admission, and faculty employment practices, must be non-discriminatory and in accord with federal and state statutes, rules, and regulations. There must be a faculty grievance procedure made known to all paid faculty.

C. Safeguards

The health and safety of patients, students, and faculty associated with the educational activities of the students must be adequately safeguarded.

All activities required in the program must be educational and students must not be substituted for staff.

D. Student Records

Satisfactory records must be maintained for student admission, advisement, counseling, and evaluation. Grades and credits for courses must be recorded on the student transcript and permanently maintained by the sponsor in a safe and accessible location.

E. Substantive Change

The sponsor must report substantive change(s) as described in Appendix A to CAAHEP/NCOPE in a timely manner. Additional substantive changes to be reported to NCOPE within the time limits prescribed include:

1. Change/addition/deletion of courses that represent significant departure in curriculum content;
2. Change in method of curriculum delivery;
3. Change in degree awarded;
4. Substantial increase/decrease in clock or credit hours for successful completion of a program

F. Agreements

There must be a formal affiliation agreement or memorandum of understanding between the sponsor and all other entities that participate in the education of the students describing the relationship, roles, and responsibilities of the sponsor and that entity.

APPENDIX A

Application, Maintenance and Administration of Accreditation

A. Program and Sponsor Responsibilities

1. Applying for Initial Accreditation

- a. The chief executive officer or an officially designated representative of the sponsor completes a "Request for Accreditation Services" form and returns it to:

NCOPE
330 John Carlyle St., Suite 200
Alexandria, VA 22314

The "Request for Accreditation Services" form can be obtained from the National Commission on Orthotic and Prosthetic Education (NCOPE), CAAHEP, or the CAAHEP website at www.caahep.org.

Note: There is **no** CAAHEP fee when applying for accreditation services; however, individual committees on accreditation may have an application fee.

- b. The program undergoes a comprehensive review, which includes a written self-study report and an on-site review.

The self-study instructions and report form are available from the NCOPE. The on-site review will be scheduled in cooperation with the program and NCOPE once the self-study report has been completed, submitted, and accepted by the NCOPE.

2. Applying for Continuing Accreditation

- a. Upon written notice from the NCOPE, the chief executive officer or an officially designated representative of the sponsor completes a "Request for Accreditation Services" form, and returns it to:

NCOPE
330 John Carlyle St., Suite 200
Alexandria, VA 22314.

- b. The program may undergo a comprehensive review in accordance with the policies and procedures of the NCOPE.

If it is determined that there were significant concerns with the on-site review, the sponsor may request a second site visit with a different team.

After the on-site review team submits a report of its findings, the sponsor is provided the opportunity to comment in writing and to correct factual errors prior to the NCOPE forwarding a recommendation to CAAHEP.

3. Administrative Requirements for Maintaining Accreditation

- a. The program must inform the NCOPE and CAAHEP within a reasonable period of time (as defined by NCOPE and CAAHEP policies) of changes in chief executive officer, dean of health professions or equivalent position, and required program personnel.
- b. The sponsor must inform CAAHEP and the NCOPE of its intent to transfer program sponsorship. To begin the process for a Transfer of Sponsorship, the current sponsor must submit a letter (signed by the CEO or designated individual) to CAAHEP and the NCOPE that it is relinquishing its sponsorship of the program. Additionally, the new sponsor must submit a "Request for Transfer of Sponsorship Services" form. The NCOPE has the discretion of requesting a new self-

study report with or without an on-site review. Applying for a transfer of sponsorship does not guarantee that the transfer of accreditation will be granted.

- c. The sponsor must promptly inform CAAHEP and the NCOPE of any adverse decision affecting its accreditation by recognized institutional accrediting agencies and/or state agencies (or their equivalent).
- d. Comprehensive reviews are scheduled by the NCOPE in accordance with its policies and procedures. The time between comprehensive reviews is determined by the NCOPE and based on the program's on-going compliance with the Standards, however, all programs must undergo a comprehensive review at least once every ten years.
- e. The program and the sponsor must pay NCOPE and CAAHEP fees within a reasonable period of time, as determined by the NCOPE and CAAHEP respectively.
- f. The sponsor must file all reports in a timely manner (self-study report, progress reports, annual reports, etc.) in accordance with NCOPE policy.
- g. The sponsor must agree to a reasonable on-site review date that provides sufficient time for CAAHEP to act on a NCOPE accreditation recommendation prior to the "next comprehensive review" period, which was designated by CAAHEP at the time of its last accreditation action, or a reasonable date otherwise designated by the NCOPE.

Failure to meet any of the aforementioned administrative requirements may lead to administrative probation and ultimately to the withdrawal of accreditation. CAAHEP will immediately rescind administrative probation once all administrative deficiencies have been rectified.

4. Voluntary Withdrawal of a CAAHEP- Accredited Program

Voluntary withdrawal of accreditation from CAAHEP may be requested at any time by the Chief Executive Officer or an officially designated representative of the sponsor writing to CAAHEP indicating: the last date of student enrollment, the desired effective date of the voluntary withdrawal, and the location where all records will be kept for students who have completed the program.

5. Requesting Inactive Status of a CAAHEP- Accredited Program

Inactive status may be requested from CAAHEP at any time by the Chief Executive Officer or an officially designated representative of the sponsor writing to CAAHEP indicating the desired date to become inactive. No students can be enrolled or matriculated in the program at any time during the period in which the program is on inactive status. The maximum period for inactive status is two years. The sponsor must continue to pay all required fees to the NCOPE and CAAHEP to maintain its accreditation status.

To reactivate the program the Chief Executive Officer or an officially designated representative of the sponsor must notify CAAHEP of its intent to do so in writing to both CAAHEP and the NCOPE. The sponsor will be notified by the NCOPE of additional requirements, if any, that must be met to restore active status.

If the sponsor has not notified CAAHEP of its intent to re-activate a program by the end of the two-year period, CAAHEP will consider this a "Voluntary Withdrawal of Accreditation."

B. CAAHEP and Committee on Accreditation Responsibilities – Accreditation Recommendation Process

1. After a program has had the opportunity to comment in writing and to correct factual errors on the on-site review report, the NCOPE forwards a status of public recognition recommendation to the CAAHEP Board of Directors. The recommendation may be for any of the following statuses: initial accreditation, continuing accreditation, transfer of sponsorship, probationary accreditation, withhold accreditation, or withdraw accreditation.

The decision of the CAAHEP Board of Directors is provided in writing to the sponsor immediately following the CAAHEP meeting at which the program was reviewed and voted upon.

2. Before the NCOPE forwards a recommendation to CAAHEP that a program be placed on probationary accreditation, the sponsor must have the opportunity to request reconsideration of that recommendation or to request voluntary withdrawal of accreditation. The NCOPE's reconsideration of a recommendation for probationary accreditation must be based on conditions existing both when the committee arrived at its recommendation as well as on subsequent documented evidence of corrected deficiencies provided by the sponsor.

The CAAHEP Board of Directors' decision to confer probationary accreditation is not subject to appeal.

3. Before the NCOPE forwards a recommendation to CAAHEP that a program's accreditation be withdrawn or that accreditation be withheld, the sponsor must have the opportunity to request reconsideration of the recommendation, or to request voluntary withdrawal of accreditation or withdrawal of the accreditation application, whichever is applicable. The NCOPE's reconsideration of a recommendation of withdraw or withhold accreditation must be based on conditions existing both when the NCOPE arrived at its recommendation as well as on subsequent documented evidence of corrected deficiencies provided by the sponsor.

The CAAHEP Board of Directors' decision to withdraw or withhold accreditation may be appealed. A copy of the CAAHEP "Appeal of Adverse Accreditation Actions" is enclosed with the CAAHEP letter notifying the sponsor of either of these actions.

At the completion of due process, when accreditation is withheld or withdrawn, the sponsor's Chief Executive Officer is provided with a statement of each deficiency. Programs are eligible to re-apply for accreditation once the sponsor believes that the program is following the accreditation *Standards*.

Any student who completes a program that was accredited by CAAHEP at any time during his/her matriculation is deemed by CAAHEP to be a graduate of a CAAHEP-accredited program.

APPENDIX B

CORE CURRICULUM FOR EDUCATIONAL PROGRAMS IN ORTHOTICS AND PROSTHETICS

Section A ENTRY-LEVEL COMPETENCIES

The graduate entering the profession must effectively demonstrate competence in the following content areas:

- A.1. Exemplify the role of the orthotist / prosthetist in providing ethical, patient-centered care by applying accepted professional responsibilities in clinical practice experiences.
- A.2. Practice safety of self and others, and adhere to safety procedures throughout the provision of orthotic / prosthetic services.
- A.3. Demonstrate appropriate insight into clinical practice, clinical operations, and practice management.
- A.4. Demonstrate an awareness of the humanity and dignity of all patients and related individuals within a diverse and multicultural society.
- A.5. Comprehend and demonstrate knowledge of the collaborative role of the orthotist / prosthetist as a member of the interdisciplinary rehabilitation team in providing patient-centered care.
- A.6. Demonstrate the ability to employ evidence-based practice with an understanding of the research processes and how to use research findings to appropriately influence clinical practice.
- A.7. Demonstrate the ability to integrate knowledge of the fundamental concepts of human function (physical, cognitive, social, psychological) with the practice framework of assessment, formulation, implementation, and follow-up of a comprehensive orthotic / prosthetic treatment plan.
- A.8. Demonstrate the ability to make clinical decisions designed to meet patient needs and expectations, and measure effectiveness of O&P intervention by utilizing (or administering) appropriate outcome measures.
- A.9. Demonstrate the ability to provide effective education to patients, their support networks, health care professionals, and the public at large.
- A.10. Document pertinent information that supports the provision of effective communication and meets the requirements of legal, business, and financial parameters for patient care.
- A.11. Demonstrate proficiency in fundamental technical procedures that support orthotic / prosthetic practice.

Section B BASIC SCIENCE CURRICULUM

The basic science curriculum must include appropriate content in:

- B.1. Life Sciences / Biology
- B.2. Chemistry

- B.3. Physics
- B.4. Human Anatomy and Physiology
- B.5. Psychology
- B.6. Statistics

Each sponsoring educational institution should determine whether components of the Basic Science Curriculum are incorporated into the professional curriculum or are required prior to entry into the program.

Section C PROFESSIONAL CURRICULUM

C.1.0 Foundational Content Areas

The following content areas relating to the foundations of orthotic and prosthetic practice must be included in the curriculum:

- C.1.1 Behavioral Sciences
- C.1.2 Clinical Pathology
- C.1.3 Clinical Pharmacology
- C.1.4 Clinical Skills
- C.1.5 Clinical Technologies
- C.1.6 Communication Skills
- C.1.7 Diagnostic Studies
- C.1.8 Ethics
- C.1.9 Evidence-Based Practice
- C.1.10 Health Care Economics
- C.1.11 Human Anatomy and Physiology
- C.1.12 Kinesiology and Gait Analysis
- C.1.13 Materials Science and Mechanical Principles
- C.1.14 Models of Disablement
- C.1.15 Neuroscience
- C.1.16 Practice Management
- C.1.17 Professional Issues
- C.1.18 Rehabilitation Science
- C.1.19 Research Methods
- C.1.20 Technical Skills

Definitions for Foundational Content Areas:

- C.1.1 **Behavioral Science:** The study of fundamental psychological concepts in personality and disability in relation to healthcare, self-care and the role of relationship building in clinical decision making. Strategies include the recognition of behaviors; ability to work with individuals in distress, stages of grief and emotional adjustment; identification of problematic psychological symptoms necessitating referral to appropriate health care providers; application of motivational techniques; and care for one’s own physical, mental and emotional health.

- C.1.2 **Clinical Pathology:** The study of conditions commonly referred for orthotic / prosthetic services. Content emphasizes orthopedic, neurological, neuromuscular, vascular and psychological disorders and diseases.

- C.1.3 Clinical Pharmacology: The study of the effects of current pharmacological treatments and the impact on clinical decisions for conditions encountered in orthotic / prosthetic patient care. Strategies emphasize the clinical effects on physiological (i.e. volume management, cardiac performance, pain, spasticity, dermatological reaction) and psychological function.
- C.1.4 Clinical Skills: The study and supervised practice of skills in orthotic / prosthetic practice. Strategies include the development of professional relationships, use of assessment tools and objective measures to determine intervention strategies, development and implementation of treatment plans, use of evidence-based practices to answer clinical questions, education of stakeholders, and maintenance of documentation in compliance with legal regulations and requirements.
- C.1.5 Clinical Technologies: The study of conventional and emerging theories, techniques and technologies and their integration into clinical orthotic / prosthetic practice. Strategies include application of these technologies to the assessment, formulation, implementation, follow-up and/or practice management of an orthotic / prosthetic treatment plan.
- C.1.6 Communication Skills: The study of communication and interaction with others along the continuum of care including the patient, family, caregivers, members of the healthcare team and others involved in achieving expected treatment outcomes. Interactions should be sensitive to the cultural, psychosocial, age, disability and socio-economic status of the person(s) with whom the interaction takes place.
- C.1.7 Diagnostic Studies: The study and consideration of information derived from medical reports, tests, and measures that aid the provision of orthotic / prosthetic care.
- C.1.8 Ethics: The study of ethical reasoning inclusive of the identification, analysis and application of principles to make judgments based on scientific facts. Strategies emphasize the consideration of all stakeholders' views, ethical principles, respect for persons, maximizing benefits/minimizing harms and justice.
- C.1.9 Evidence-Based Practice: The study of integrating scientific knowledge with clinical expertise to design, implement and evaluate patient-specific orthotic / prosthetic interventions. Strategies include the critical appraisal and synthesis of patient values and goals, scientific evidence, and clinical expertise.
- C.1.10 Health Care Economics: The study of economics related to efficiency, effectiveness, value and behavior in the production and consumption of health care to understand how the orthotic / prosthetic profession fits in the entire healthcare industry and economy.
- C.1.11 Human Anatomy and Physiology: The study of anatomical structures and physiological functions of the nervous, musculoskeletal, cardiopulmonary and integumentary systems of the human body. Strategies include the identification and differentiation of gross anatomical structures and the palpation of surface anatomy and relating structures to corresponding functional anatomy.
- C.1.12 Kinesiology and Gait Analysis: The study of normal and pathological human movement, performance and function through the application of biomechanical and motor control principles with an emphasis on joints, moments, and ground reaction forces. Strategies include methods to study normal and pathological movements via gait analysis; the action and effects of external and internal forces on the musculoskeletal system; the body structure/function changes due to over-, under- and non-use of body segments; and the

influence of orthotic / prosthetic devices on skin integrity, muscular tissue, bone growth, posture, balance and mobility.

- C.1.13 Material Science and Mechanical Principles: The study of physical / mechanical properties and behavior for the appropriate design and selection of materials commonly used in orthotic / prosthetic practice. Strategies include the evaluation of components' physical / mechanical / material properties and behavior in relation to its common clinical application. Concepts include, but are not limited to force vectors, design geometry (including stress concentrations), pressure distribution, stress/strain, friction, fatigue resistance, stiffness and corrosion resistance.
- C.1.14 Models of Disablement: The study of frameworks used to define and delineate the consequences of disease and injury on both personal and societal levels. Strategies emphasize effective communication with all members of the rehabilitation team. C.1.15 Neuroscience: The study of neuroanatomy and related neurological function. Content emphasizes neurological disorders encountered in clinical orthotic / prosthetic practice.
- C.1.16 Practice Management: The study of business practices within the orthotic / prosthetic clinical environment. Content includes clinical decision-making, thorough and ethical documentation, coding and prescription recommendations, compliance with regulatory accreditation agencies, legal considerations surrounding patient care, quality improvement, time management and project management. In addition, content on the business aspect of practice related to personnel policies and procedures.
- C.1.17 Professional Responsibilities: The study of the expectations of the orthotist-prosthetist as a professional and his/her role within the profession itself and the profession within society. Strategies include the exploration and understanding of the organizations and documents that guide practice within the profession (e.g., Scopes of practice, Code of Professional Responsibility, Practice Analysis); the role of the orthotist-prosthetist and related personnel in the healthcare team; and the responsibilities to further professional development of self and others.
- C.1.18 Rehabilitation Science: The study of the scope and variance of rehabilitation practices within sociocultural contexts. Strategies include the understanding of stakeholders' perspectives in orthotic / prosthetic patient care; appreciating the implications of stakeholder perspectives on clinical decision-making; analyzing and synthesizing clinical and functional outcomes; and identifying efficacy of provision of orthotic / prosthetic services.
- C.1.19 Research Methods: The study of the methods required to formulate clinically-relevant scientific questions and suitable hypotheses to support evidence-based practice. Strategies include understanding of the ethical considerations involved in the design, implementation and reporting of research findings; the rights of human subjects; identification and recruitment of participants; collection and analysis of data; and dissemination of research findings.
- C.1.20 Technical Skills: The study and supervised practice of psychomotor skills necessary to ensure the safe and appropriate use of tools and equipment to formulate and implement orthotic / prosthetic treatment plans. Strategies include the use of technical/mechanical problem solving to assess, adjust, and direct the fabrication of orthoses/prostheses to meet patient-specific needs.

C.2.0 Patient Assessment

The graduate must demonstrate the ability to complete the following essential elements of the patient evaluation process competently:

- C.2.1 Effectively communicate with the patient or caregiver to gather cogent and useful information for orthotic and/or prosthetic assessments.
- C.2.2 Identify concerns (e.g., ADL, gait training) necessitating referral to other health care providers and determine methods and criteria for referral.
- C.2.3 Document services using established record-keeping techniques to record patient assessment and treatment plans, to communicate fabrication requirements and to meet standards for reimbursement and requirements of external agencies.
- C.2.4 Perform a comprehensive assessment of the patient using standardized methods to obtain an understanding of the individual's potential orthotic / prosthetic needs. Students must demonstrate the ability to acquire the following through interview, review of clinical documentation, physical exam, and administration of performance measures.
 - C.2.4.1. Patient History
 - i. Chief Complaint
 - ii. Current health condition, including comorbidities
 - iii. Prior medical conditions and surgical history (e.g. heart / musculoskeletal / allergies / skin)
 - iv. Diagnostic imaging reports
 - v. Medications
 - vi. Past orthotic / prosthetic management
 - vii. Review of clinical chart
 - C.2.4.2 Patient Assessment
 - i. Body Structure & Function: Volumetric measures, Skin integrity / Wounds, Condition of contralateral side, Range of motion / Joint integrity and stability, Sensory testing / Proprioceptive sense / Pain, Muscle Tone / Strength, Neuromusculoskeletal integration / Motor control, Cognitive ability
 - ii. Activity & Participation: Observational gait analysis, Postural & balance evaluation, Vocation / Daily functional demands, Recreational activities, Mobility / Activity Level
 - iii. Personal Factors: Patient goals / Motivation level / Social support, Personal implications of impairment, Financial information
 - iv. Environmental Factors: Living environment, Work environment, Recreational environment
 - C.2.4.3 Outcome Assessment: Use and interpret appropriate, patient-reported and performance-based outcome measures to assess achievement of patient-specific orthotic / prosthetic outcomes as compared to baseline measures.
 - i. Assessment of outcome data and evaluation and interpretation of findings
 - ii. Reassessment of healthcare and/or biomechanical needs over time
 - iii. Alteration of treatment plan as indicated to increase or maintain optimal quality of life throughout the patient's lifespan

- C.2.5 Consult with other caregivers and other relevant healthcare professionals as necessary. Professionally communicate using written, oral, and nonverbal methods with patients, colleagues, and other healthcare providers.
- C.2.6 Demonstrate a basic understanding of surgical processes and procedures related to orthotic and prosthetic care and how these and their sequelae impact orthotic and prosthetic design and function.
 - i. Surgical Procedures: Amputation Surgery and Revision, Rotationplasty, Joint Replacement, Tendon Lengthening, Ligament Repairs / Reconstruction, Spinal Stabilization, Joint Fusions, Osseointegration, Targeted Muscle Reinnervation, Limb Lengthening, Limb Salvage
 - ii. Surgical Processes: Perioperative O&P services, Post-operative Complications
- C.2.7 Demonstrate a basic understanding of pathologies as it relates to O&P management, the professional curriculum includes content and learning experiences of the following diseases and diagnoses commonly seen by orthotists / prosthetists in clinical practice.
 - C.2.7.1 Musculoskeletal disorders of the Lower Limb:
 - i. Ankle / Foot Disorders: Abnormal Alignment: (i.e., Pronation / Supination, Rearfoot Varus / Valgus, Forefoot Varus / Valgus, Hallux Valgus, Hallux Rigidus, Plantarflexed 1st Ray, Metatarsus Adductus), Talipes Calcaneovarus / Calcaneovalgus/Equinovarus, Plantar fasciitis, Metatarsalgia, Tarsal Coalition, Posterior Tibial Tendon Dysfunction, Morton's neuroma, Charcot Arthropathy
 - ii. Knee Disorders: Sprains, strains, Ligament injuries, Cartilage/meniscus injuries, Osteoarthritis, Dislocation/subluxation, Angulation osteotomy, Osgood Schlatter
 - iii. Hip Disorders: hip dislocation, Legg-Calve-Perthes, Hip dysplasia, Developmental Dislocating Hip
 - C.2.7.2 Musculoskeletal disorders of the Upper Limb
 - i. Injuries, disorders and deformities: finger, wrist, elbow, and shoulder
 - ii. Shoulder Conditions: Rotator Cuff, Adhesive Capsulitis
 - iii. Dislocations
 - C.2.7.3 Musculoskeletal disorders of the spine
 - i. Spinal deformities: Scoliosis (Congenital and Idiopathic), Scheuermann's Kyphosis
 - ii. Spondylolysis / Spondylolisthesis
 - iii. Degenerative disorders: Spinal stenosis, Osteoporosis, Disc Herniation
 - iv. Spine Trauma: Spinal Fracture, Spinal Dislocation
 - v. Vertebral osteomyelitis
 - C.2.7.4 General Musculoskeletal conditions
 - i. Contractures
 - ii. Fractures
 - iii. Repetitive stress injuries
 - iv. Ligamentous injuries
 - v. Articular cartilage disorders
 - vi. Rheumatoid Arthritis
 - vii. Osteoarthritis
 - viii. Skin condition
 - C.2.7.5 Limb Loss
 - i. Upper Limb: Partial Hand, Transradial, Transhumeral, Shoulder Complex, Joint Disarticulations

- ii. Lower Limb: Partial Foot / Transmetatarsal, Ankle Disarticulation, Transtibial, Transfemoral, Joint Disarticulations, Hemi-Pelvectomy
- iii. Bilateral / Multiple Limb Loss
- iv. Congenital Limb Deficiencies: Tibial / Fibular Deficiency, Radial deficiency, Proximal Femoral Focal Deficiency

C.2.7.6 Neurologic Disorders

- i. Stroke
- ii. Guillain-Barre syndrome
- iii. Amyotrophic Lateral Sclerosis
- iv. Hereditary motor and sensory disorders
- v. Multiple sclerosis
- vi. Peripheral nerve injuries
- vii. Peripheral neuropathies
- viii. Poliomyelitis and Post-Polio Syndrome
- ix. Spinal cord injuries
- x. Brachial Plexus injury
- xi. Transverse myelitis
- xii. Traumatic brain injuries
- xiii. Charcot-Marie-Tooth
- xiv. Spasticity general

C.2.7.7 Pediatric Neurologic Conditions

- i. Cerebral Palsy
- ii. Spina Bifida
- iii. Spinal Cord / Traumatic Brain Injuries
- iv. Cranial Disproportional
- v. Spinal Muscular Atrophy

C.2.7.8 Pediatric Musculoskeletal disorders

- i. Hip disorders: Developmental Dysplasia of the Hip
- ii. Arthrogyriposis Multiplex Congenita
- iii. Osteogenesis Imperfecta
- iv. Muscular Dystrophies

C.2.7.9 Neuropathic Disorders

- i. Buerger's Disease
- ii. Diabetes Mellitus
- iii. Vascular Disease

C.2.7.10 Other Disorders

- i. Osteogenic Sarcoma
- ii. Metastatic Disease of the Bone
- iii. Complex Regional Pain Syndrome
- iv. Genetic Syndromes: Marfan Syndrome, Down's Syndrome, Ehlers-Danlos Syndrome

C.2.7.11 Skin Conditions

C.3.0 Formulation of a Treatment Plan

The graduate must demonstrate the ability to integrate and apply foundational knowledge and patient information to perform and direct potential orthotic or prosthetic management, including the following:

- C.3.1 Synthesize and integrate foundational knowledge and best available evidence with findings from the assessment of a patient.
- C.3.2 Analyze impairments, functional limitations, and patient goals to identify health status and determine the related biomechanical objectives.
 - C.3.2.1 Evaluate findings to determine the patient-specific healthcare need and/or biomechanical need.
 - C.3.2.2 Identify and explain abnormal biomechanics to determine a necessary intervention and apply principles of biomechanics to predict long-term outcomes.
 - C.3.2.3 Identify specific and measurable orthotic / prosthetic treatment goals.
 - C.3.2.4 Identify and appropriately recommend orthotic and prosthetic care conducive to age, functional status, cognitive function, and physiological changes, across the continuum of care from pediatric to geriatric.
- C.3.3 Formulate Device Design:
 - C.3.3.1 Formulate a patient-specific orthotic/prosthetic treatment plan that integrates physical evaluation findings, activity/participation needs, environmental/personal factors and patient concerns or goals.
 - C.3.3.2 Select components, materials, suspension and fabrication methods to match patient specific needs.
- C.3.4 Communicate treatment plan:
 - C.3.4.1 Communicate with the health care team to corroborate findings, and ensure orthotic / prosthetic treatment goals fit into the overall rehabilitation/medical plan.
 - C.3.4.2 Communicate with the patient and caregiver to develop the recommended treatment plan and disclose the potential risks and benefits of O&P care.

C.4.0 Implementation of a Treatment Plan

The graduate must demonstrate the necessary clinical skills to provide comprehensive orthotic / prosthetic care enhancing the patient's quality of life, including the following:

- C.4.1 Clinical Decisions and Interactions: Demonstrate procedures and processes to implement prosthetic / orthotic interventions by using appropriate techniques, tools, equipment, and safety considerations in clinical contexts.
 - C.4.1.1 Perform proper patient handling techniques and initial gait and mobility training.
 - i. Patient transfers
 - ii. Sit-to-stand, Stand-to-sit
 - iii. Gait belt application and use
 - iv. Bed mobility

- C.4.1.2 Locate and indicate anatomical structures needed to capture proper alignment.
 - C.4.1.3 Capture two-dimensional anatomical structures needed to represent shape and alignment.
 - C.4.1.4 Capture three-dimensional anatomical shapes utilizing plaster of Paris and synthetic materials and computer aided technology to create a positive model.
 - C.4.1.5 Modify/rectify three-dimensional models to achieve biomechanical principles and address the defined treatment goals.
 - C.4.1.6 Identify EMG signals and place electrodes to operate electric components.
 - C.4.1.7 Compare body-powered and external-powered orthotic/prosthetic control principles.
 - C.4.1.8 Apply principles of biomechanics, anatomy, and physiology to evaluate the fit, alignment, and function of orthoses / prostheses making adjustments as necessary to optimize patient outcomes. Evaluation includes analysis of the following criteria:
 - i. Anatomical congruency
 - ii. Appropriate trim lines
 - iii. Appropriate static and dynamic alignment
 - iv. Suspension and control
 - v. Volume management
 - vi. Patient-specific activity/function to include corrective and/or accommodative objectives
 - vii. Prescription criteria
 - viii. Suitable patient preferences and limitations
 - C.4.1.9 Assess the quality and structural stability of the orthosis or prosthesis to conform to patient-specific needs.
 - C.4.1.10 Provide effective, culturally appropriate education to patients, family members and caregivers on the care, use and maintenance of the orthosis or prosthesis, including skin care information and wearing schedules.
- C.4.2 Technical Decisions and Competencies: Apply material and mechanical principles to explain, design, and fabricate patient-specific devices. Implementation of mechanical concepts should address the safety, alignment, and durability needs of the user.
- C.4.2.1 Distinguish characteristics of thermoformable plastics, thermoset resins, foams, metals and other materials used in orthotics and prosthetics.
 - C.4.2.2 Perform thermoforming procedures.
 - C.4.2.3 Perform lamination procedures.
 - C.4.2.4 Contour metals to include squaring of joints.
 - C.4.2.5 Align prosthesis and orthosis to initial specifications of the patient and components.
 - C.4.2.6 Establish mechanical / anatomical joint alignment.

C.4.2.7 Demonstrate ability to finish materials: Thermoplastic, Metals, Foams, and Composites.

C.4.2.8 Demonstrate proper use of fasteners: Rivets, Adhesives, and Straps.

C.4.3 Safety in Clinical and Technical Contexts: Comply with personal and environmental safety practices through proper use and care of tools and equipment including the following:

- i. Hand tools
- ii. Measurement tools
- iii. Machine tools
- iv. Personal protective equipment (e.g., gloves, dustmasks, eye protection)
- v. Safety Data Sheets (SDS) for commonly used adhesives, solvents and materials
- vi. Proper Flammable materials handling and storage
- vii. Safe evacuation principles for staff and patients in case of emergency
- viii. General equipment: ovens, compressors, vacuum pumps, fume and dust extraction apparatus

C.5.0 Follow-Up

The graduate must demonstrate the ability to develop and implement an effective follow-up plan to assure optimal fit and function of the orthosis or prosthesis and monitor the outcome of the treatment plan; including the following:

C.5.1 Describe continuing care and periodic re-evaluation of the patient and intervention to assure, maintain, and document comprehensive orthotic / prosthetic care.

C.5.2 Create and evaluate a long-term follow-up plan for comprehensive orthotic / prosthetic care based upon patient initial evaluation results.

C.5.3 Describe wear & care, prognosis, volume fluctuations, and anticipated changes with age, growth, or time in order to assure understanding among patients and caregivers and their role in comprehensive orthotic / prosthetic care.

C.6.0 Practice Management

The graduate must demonstrate the ability to identify and observe policies and procedures relating to practice management, including the following:

C.6.1 Demonstrate knowledge of billing and coding procedures.

C.6.2 Describe Federal, state, and third party regulations associated with orthotic / prosthetic care.

C.6.3 Document in accordance with professional standards and in compliance with legal and payer policies. Document all interactions with the patient and caregiver

C.6.4 Describe how orthotists / prosthetists comply with ethical and legal responsibilities related to comprehensive orthotic and prosthetic care.

C.6.5 Describe potential roles that the clinician plays within O&P business hierarchy.

C.6.6 Use terminology specific to Medicare, with an understanding of L-coding history and usage, ICD 10 codes, state regulations and third-party payer reimbursements.

C.7.0 Professional / Personal Development

The graduate must be able to articulate the importance of personal and professional development in relation to each of the following areas:

- C.7.1 The importance of lifelong learning with the goal of maintaining knowledge and skills at the most current level.
- C.7.2 The role of community service, patient advocacy and outreach.
- C.7.3 The areas for participation in service to and development of the profession.
- C.7.4 Self-awareness, and identification of the mechanisms to maintain personal physical and mental well-being.
- C.7.5 Professional empathy, responsibility, and ethics.
- C.7.6 The international orthotic / prosthetic community and patient populations.

C.8.0 Experience in a Patient Care Setting

Practice expectations are a description of behaviors, skills, or knowledge that defines the expected performance of the Orthotist and Prosthetist upon entry into clinical practice. These include the graduate's ability to participate in and demonstrate entry-level competencies learned in didactic and clinical curriculum within the following domains. The curriculum plan includes clinical education experiences that provide exposure to:

- C.8.1 A comprehensive evaluation of a patient, including functional baseline assessment, to understand the patient's orthotic / prosthetic needs, goals, and expectations.
- C.8.2 Analysis and integration of information from a patient assessment to create a comprehensive orthotic / prosthetic treatment care plan to appropriately meet the needs, goals, and expectations of the patient.
- C.8.3 Fabrication, fitting, and maintenance of orthoses / prostheses in order to provide comprehensive orthotic / prosthetic care.
- C.8.4 Continued patient care through periodic evaluation to ensure, maintain, and document optimal fit and function of the orthoses / prostheses.
- C.8.5 Interprofessional communication among practitioners, patients, caregivers and others encountered in the clinical environment.
- C.8.6 Business management functions within the orthotic/prosthetic practice.

C.9.0 Orthotic / Prosthetic Clinical Practices

The required content and interventions below integrate many of the competencies described in Section C.2 – C.4. and they must be included in the O&P curriculum. They reflect the demands of the patient population and the profession. At a minimum, each graduate must demonstrate competence in the following essential orthotic/prosthetic clinical practices.

- C.9.1 Comprehension and Evaluation: Graduates will demonstrate understanding of foundational knowledge in prescription recommendation, orthotic and prosthetic design, material selection, biomechanical principles, fitting, evaluation, adjustment and patient specific outcomes for the following:
- i. LOWER LIMB ORTHOSES
 1. Footwear
 - a. Orthopedic, diabetic and custom shoes
 - b. Shoe modifications
 2. Foot orthoses (FO)
 3. UCBL foot orthoses
 4. Supramalleolar orthoses (SMO)
 5. Ankle-foot orthoses (AFO)
 - a. Posterior leaf spring
 - b. Solid ankle
 - c. Floor reaction
 - d. Articulated
 - e. Composite
 - f. Ankle gauntlet
 - g. Metal and leather
 6. Knee orthoses (KO)
 7. Knee-ankle-foot orthoses (KAFO) including stance control
 8. Hip orthoses (HO)
 9. Hip-knee-ankle-foot orthoses (HKAFO) including reciprocating gait orthosis (RGO)
 10. Neuromuscular electrical simulation (NMES)/Functional electrical stimulation (FES)
 11. Components
 - a. Biomechanical control strategies: stops, assists, stance control
 - b. Ankle joints
 - c. Knee joints
 - d. Hip joints
 - ii. UPPER LIMB ORTHOSES
 1. Finger orthoses (FO)
 2. Thermoplastic and metal hand orthoses (HO)
 3. Thermoplastic and metal wrist-hand orthoses (WHO)
 4. Additions and outriggers to HO's and WHO's
 5. Prehension orthoses (WHFO)
 6. Elbow orthoses (EO)
 7. Elbow-wrist-hand orthoses (EWHO)
 8. Shoulder-elbow-wrist hand orthoses (SEWHO)
 - iii. SPINAL and CRANIAL ORTHOSES
 1. Cranial remodeling orthoses
 2. Facial fracture & facial burn orthoses
 3. Cervical orthoses (CO)
 4. Cervico-thoracic orthoses (CTO) including HALO

5. Cervico-thoraco-lumbo-sacral orthoses (CTLSO)
 6. Thoraco-lumbo-sacral orthoses (TLSO)
 7. Lumbo-sacral orthoses (LSO)
 8. Scoliosis orthotic management, including pad placement, angle measurement, blueprinting, curve management, wearing schedule, orthotic design variants
- iv. UPPER LIMB PROSTHESES
1. Socket designs for all amputation levels including partial hand, wrist disarticulation, transradial, elbow disarticulation, transhumeral, shoulder disarticulation, and interscapular thoracic, bilateral, and congenital limb differences. Socket design variations: flexible inner liner with rigid frame, including silicone
 2. Suspension methods and variants for upper limb prostheses
 - a. Anatomical suspension
 - b. Roll-on Liners (locking pin, vacuum, and custom liner options)
 - c. Harness variations for different levels
 3. Components (i.e., passive, body-powered, electric, and activity specific)
 - a. Passive, mechanical, and powered digits
 - b. Terminal devices (voluntary opening, voluntary closing, external powered and activity specific)
 - c. Wrists
 - d. Elbows
 - e. Shoulders
 - f. Gloves and coverings (OTS, Semicustom, High Definition Silicone Restorations)
 - g. Edoskeletal and exoskeletal
 4. Control principles
 - a. Body-powered control systems and strategies
 - b. External-powered control systems and strategies
 - Surface EMG Electrodes evaluation and troubleshooting (powered terminal device, wrist and elbow functions)
 - Alternate input devices
- v. LOWER LIMB PROSTHESES
1. Socket designs for all lower limb amputation levels and congenital limb differences including transpelvic and translumbar levels. Socket design variations: flexible inner liner with rigid frame, joint and corset, femoral deficiency and rotationplasty
 2. Suspension methods for lower limb prostheses
 - a. Anatomical suspension
 - b. Roll-on liners (suction, lanyard, and locking pin)
 - c. Waist belt
 - d. Hip joint and pelvic band
 - e. Suction, vacuum
 - f. Silesian belt
 3. Components
 - a. Feet
 - b. Ankles
 - c. Knees
 - d. Hips
 - e. Shock, torque absorbers, rotators
 - f. Cosmetic/protective covers
 4. Post-operative prostheses
 5. Compression therapy (shrinker or elastic wrap)

C.9.2 Prefabricated and Custom Fit: Graduates will demonstrate entry-level competence and experience with the evaluation, recommendation, implementation, material selection, application of biomechanical principles, fitting, adjustment, troubleshooting, and identification of patient specific outcomes for the following custom-fit orthoses:

- i. LOWER LIMB ORTHOSES
 1. Knee Orthosis (KO)
 2. Hip Orthosis (HO)
 3. Ankle Foot Orthosis (AFO) – Thermoplastic and composite
 4. Fracture Orthosis

- ii. SPINAL ORTHOSES
 1. Cervical Orthosis (CO)
 2. Cervical Thoracic Orthosis (CTO)
 3. HALO and ring (simulation)
 4. Rigid anterior control thoraco-lumbo-sacral orthosis (TLSO)
 5. Flexible and rigid thoraco-lumbo-sacral orthosis (TLSO)
 6. Flexible and rigid lumbo-sacral (LSO)

- iii. UPPER LIMB ORTHOSES
 1. Prehension orthosis
 2. Shoulder-elbow-wrist-hand orthosis (SEWHO)
 3. Fracture orthosis

C.9.3 Custom Fabricate and Fit: Each graduate of the program will demonstrate skill and experience in the evaluation, recommendation, implementation, material selection, application of biomechanical principles, fitting, adjustment, troubleshooting and evaluation of patient outcomes with the following custom-fabricated orthoses and prostheses:

- i. LOWER LIMB ORTHOSES
 1. Foot Orthoses (FO) -a minimum of 2 orthoses and must include:
 - a. Functional or accommodative FO
 - b. UCBL (Incl. Carlson Modification)
 2. Shoe Modification - Rocker
 3. Thermoplastic AFO-minimum of 2 orthoses and must include:
 - a. Non-articulating
 - b. Articulating
 - c. Capture a minimum of 3 three-dimensional anatomical shapes utilizing plaster of paris and/or synthetic material
 4. Thermoplastic KAFO-minimum of 1 orthosis and must include:
 - a. Articulated knee joints

- ii. SPINAL ORTHOSES-minimum of 1 orthosis:
 1. LSO or TLSO (Thermoplastic)

- iii. UPPER LIMB ORTHOSES-minimum of 1 orthosis:
 1. WHO or WHFO

- iv. UPPER LIMB PROSTHESES
 - 1. Transradial or wrist disarticulation prostheses-minimum of 2 prostheses and must include:
 - a. Anatomical suspension
 - b. Figure-8 harness suspension
 - 2. Transhumeral prosthesis or prosthetic simulation-minimum of 1 prosthesis with:
 - a. Locking elbow joints and dual-control harness

- v. LOWER LIMB PROSTHESES
 - 1. Transtibial prostheses-minimum of 2 prostheses and must include:
 - a. Patellar tendon bearing socket
 - b. Total surface bearing socket
 - c. Capture a minimum of 3 three-dimensional anatomical shapes utilizing plaster of Paris and/or synthetic material.

 - 2. Transfemoral prosthesis-minimum completion of 2 prostheses and must include:
 - a. Ischial containment socket
 - b. Dynamic alignment with one non-fluid knee and one fluid-controlled knee

Section D RESEARCH CURRICULUM

D.1.0 Research / Capstone Project

The graduate must demonstrate the ability to independently perform critical review of scientific literature and apply best available evidence to salient problems or issues in orthotics & prosthetics. The graduate must also have knowledge of the research process and be able to fulfill the role of an orthotist / prosthetist as a research consumer. Each graduate is expected to develop an original capstone project or significantly contribute to ongoing clinical or academic research as a part of his or her curriculum sequence. The student also must have opportunities to, participate and demonstrate fundamental skills in the following tasks:

- D.1.1 Clearly define a question or problem
- D.1.2 Efficiently and effectively search for relevant evidence
- D.1.3 Critically appraise relevant literature
- D.1.4 Interpret and form recommendations to apply best available evidence to salient problems or issues in orthotics & prosthetics
- D.1.5 Synthesize evidence for project
- D.1.6 Determine methods to evaluate the effectiveness of interventions and interpret results
- D.1.7 Describe the role of orthotist-prosthetist in the consumption, critique, collaboration, and conduction of research