**Job Analysis Document: Brookbush Institute Certified Personal Trainer (CPT)**

**Systematic Review of Job Task Analysis of Previous NCCA-accredited CPT Exam Providers**

**Title: Personal Trainer (CPT)**

**Summary:**

**Topic Domains**

* Domain 1: Functional Anatomy and Muscle Physiology (32%)
* Domain 2: Exercise Selection, Assessment, Cueing, Progression, and Regression (30%)
* Domain 3: Acute Variables, Program Design, Training Goals, and Adaptations (28%)
* Domain 4: Additional Topics (10%)

**CPT Exam Blueprint**

• 120 total exam questions

• 100 scored questions

• 20 pre-test questions (not scored)

• Passing/cut score = 70 out of 100 possible

• 4-option multiple choice

• Computer-based testing (Testing center and online options)

• 2-hour exam session

**Defining Personal Training**

Personal trainers are fitness professionals responsible for designing and implementing personalized exercise programs to aid individuals in achieving their fitness goals. Personal trainers work closely with clients to assess their fitness levels, set realistic goals, and provide guidance and motivation throughout the fitness training experience. Most of the trainer/client interaction is spent instructing the client while “working out,” including selecting exercises, teaching exercises, cuing form for ideal exercise performance, progressing and regressing exercises, adjusting acute variables (reps, load, sets/exercise, etc.) to optimize adaptations (with a lower risk of injury), and discussing longer-term program design to ensure optimal outcomes. Additionally, the selection of client-appropriate exercise and acute variables, cuing optimal form, and progressively and appropriately increasing exercise intensity may significantly reduce the risk of musculoskeletal injury during the fitness training experience.

***Validation of Essential Job Tasks:***

Most of the trainer/client interaction is spent instructing the client while “working out”. This implies most of the education should focus on the foundational knowledge required to perform the skills needed during “workout” instruction. The expert staff at the Brookbush Institute and the external review board agree with this assertion, and the external review board added that many certifications do not adequately prioritize this practical component of a personal trainer's job.

It is assumed that with 8 NCCA-accredited CPT exams and job analyses published, a precedent has been set regarding “standard topics” to be covered by a CPT exam. The expert staff of the Brookbush Institute decided that a systematic review (SR) of these job analyses would likely result in more accurate information regarding domains and the relative weighting of those domains when compared to a 9th job analysis survey. The potential for a job analysis survey to result in significant deviations from established norms would seem fairly large without a validated questionnaire (e.g. hypothesis generation errors, provider preference, sampling bias, etc.), and the authors are unaware of a validated questionnaire for this purpose. Note, that evidence of significant deviations may be noted in 2 certifications that exhibited large deviations from norms (large percentages of content in “Additional Information) in the SR below. A review of previously published job analyses was used to develop a “summary of domains”. The Brookbush Institute domains and exam contents were then constructed to ensure congruence with those domains. Congruence was defined as dedicating the same amount of content and test questions to a domain within 1 standard deviation of the mean percentage that domain was given by all previously published job analyses. Note, to address the staff and review board’s concerns, where possible domains including content addressing practical components of a personal trainer's job were given more weight (larger percentages).

**Domain and Weight (Percentages) Development**

This systematic review (SR) started with a review of all previously published job analyses and exam content documents that could be located from the 8 previously approved NCCA-accredited CPT exam providers (referred to as “providers” for the remainder of this document). All documents were then reviewed, and one document was selected from each provider that covered the information most relevant to this SR (cited below). Those documents are cited below. A review of these documents was then used to construct a “summary of domains”. The 4 domains (including “Additional Topics”) were developed by listing the domains and sub-topics for each provider, matching content based on “synonyms” used for similar content, and then using this matched content to infer categories that “best fit” the division of domain topics for all providers. Note, that the authors understand that there may be several domain divisions that fit the sub-topics of all providers; in fact, it took several attempts to reach the categorization of domains below. However, we do believe this categorization resulted in the least amount of content falling to the “additional information” category (by percentage), that this categorization would “make sense” to any provider reviewing this document; and further, that most providers would perceive this division of domains as “fair.” Unfortunately, without active participation from all providers, this may have been the most subjective portion of this SR. However, assuming that synonyms and like information were carefully matched, the authors doubt that this sorting and labeling issue would have resulted in a significantly different outcome. That is, regardless of how domains were selected, provided synonyms were carefully matched, it is likely that the same providers would have exhibited the same congruence and/or deviations from mean percentages given to each domain. An example of this sorting problem; some providers divided content by training goals (e.g. weight loss, hypertrophy, strength, etc.), and then discussed the ideal acute variable ranges (e.g. reps, load, sets, etc.) for each training goal. The Brookbush Institute divided content by acute variables and then discussed the ideal acute variable range for each training goal. The same content is being covered; however, it is sorted differently. This is the equivalent of reversing rows and columns in a table, and it should not have had a significant effect on outcomes (congruence as defined above).

**Topic Domains**

* Domain 1: Functional Anatomy and Muscle Physiology (32%)
* Domain 2: Exercise Selection, Assessment, Cueing, Progression, and Regression (30%)
* Domain 3: Acute Variables, Program Design, Training Goals, and Adaptations (28%)
* Domain 4: Additional Topics (10%)

Once the 3 primary domains were developed, 1 domain for “Additional Topics” was added to ensure that the analysis for congruence was based on 100% of each provider's content.

The following section lists each domain, the synonyms applying to each domain, each provider’s topics in that domain category, and their percentages relative to the provider’s total content. In some cases, percentages are estimates based on the total number of items listed under a similar domain on the cited documents, and/or estimates based on dividing subtopics listed in 2 domains into equal parts. The Brookbush Institute percentages were then listed along with a detailed breakdown of content. This detailed breakdown was then used for test development.

Note, that the goal of this SR was to determine the industry mean percentages to develop an exam that was congruent with current industry standards. For this reason, the Brookbush Institute’s percentage split of information was not used in determining the mean percentages of each domain. Further, during the development of this SR, adjustments were made to ensure that the Brookbush Institute’s percentage of each domain, topic, and number of exam questions were congruent with the mean percentages of other providers. (With some small adjustments made to address the staff and review boards' concerns regarding prioritizing the practical components of a personal trainer's job).

**Domains, Synonyms, and Content Breakdowns**

**Domain 1: Functional Anatomy and Muscle Physiology**

(Synonyms: Kinesiology, biomechanics, exercise analysis, exercises assessment, exercise sciences, foundational sciences)

**Brookbush Institute Functional Anatomy Breakdown:** This domain covers anatomical position, planes of motion, joint actions, types of muscle contractions, the joint actions resulting from concentric contractions of the major muscle groups, and the analysis of exercise based on the plane of motions, joint actions, and contributing muscles.

1. Anatomical Position & Anatomical Directions
2. Planes of Motion
3. Joint Actions
4. Synovial Joints
5. Human Movement Systems (Joints, Muscles, Connective Tissue, and Nervous System)
6. Joints of the shoulder girdle and scapular motion
7. Scapular muscles
8. Deltoids
9. Rotator cuff
   1. First exercise analysis: reverse fly
10. Pectoralis major, latissimus dorsi, and teres major
    1. Listing internal versus external shoulder rotators, and comparing the joint actions of the pectoralis major and latissimus dorsi
11. Biceps brachii, brachialis, triceps brachii, and coracobrachialis
    1. Analyzing the overhead press and close grip row, and new activity - “determine the function of a muscle”
12. Hip flexors and anterior thigh
13. Gluteus maximus and gluteus medius
14. Hamstrings and adductors
    1. Listing the flexors and extensors, internal and external rotators, and activity - “determine the function of a muscle”
15. Ankle joint actions and muscles
    1. Listing plantar flexors and dorsiflexors, and analyzing the squat
16. The spine and trunk muscles
17. Trunk Muscles Graph, Additional Core Muscles, and Core Exercise Challenge
    1. Listing the trunk actions and muscles, listing the muscles of the lumbopelvic hip complex, and the “core exercise (without hip flexion)” challenge

* **Similarities to prior job analyses and exam domains of previously NCCA-accredited CPT exams:**
  + **NFPT:** Principles of Human Anatomy 20%, Principles of Physiology 19%
  + **NESTA:** Exercise Sciences 15%
  + **NCSF:** Functional Anatomy 12% and Exercise Physiology 15%
  + **NASM:** K1 – K5 17%
  + **ACE:** Domain 1: CLIENT ONBOARDING AND ASSESSMENTS 31%
  + **NSCA:** None
  + **ACSM:** Component E. 1. Knowledge of A-O 25%
  + **NCCPT:** Domain 1: Applied Sciences, 25%

**Muscle Physiology (sub-domain of domain 1)**

(Synonyms: Applied science, functional anatomy, human physiology, exercise physiology)

**Brookbush Institute Exercise Physiology Breakdown:** This domain covers muscle cell structure and function, muscle fiber types, action potentials, motor unit recruitment, adaptation of muscle cells, etc.

1. Muscle cell structure and function
   1. Structure of muscle cells, muscle tissue traits, motor unit recruitment, sliding filament theory, and connective tissue
2. Muscle fiber types
   1. Type I and II muscle fibers, properties of Type I and II fibers, genetics, adaptations, energy systems of muscle fibers.

* Specific to the Sub-topic of Physiology: **Similarities to prior job analyses and exam domains of previously NCCA accredited CPT exams:**
  + **NFPT:** Principles of Human Physiology 19%
  + **NESTA:** Exercise Sciences 15%
  + **NCSF:** Functional Anatomy 12%
  + **NASM:** K1, K2, K4, K5 17%
  + **ACE:** None
  + **NSCA:** Program Planning C 23%
  + **ACSM:** None
  + **NCCPT:** Domain 1: Applied Sciences, 25%

**Domain 2: Exercise Selection, Assessment, Cueing, Progressions, and Regressions**

(Synonyms: Training development, programming, exercise instruction, evaluation, screening, exercise modification, exercise techniques, form modification)

**Brookbush Institute Strength and Core Progressions:** This domain covers exercise selection, the kinesiology of each exercise, subsystems recruited during each exercise, relative flexibility progressions, exercise progressions, exercise regressions, form assessment and cuing, and relevant research.

* 1. Chest progressions
  2. Back progressions
  3. Shoulder progressions
  4. Leg progressions
  5. Deadlift progressions
  6. Total body exercise progressions
  7. Lower body power exercises
  8. Upper body power exercises
  9. Bridge progressions
  10. Plank progressions
  11. Transverse abdominis progressions

**All items include:**

* + 1. Kinesiology of movement patterns
    2. Recruited myofascial subsystems
    3. Relevant research
    4. Exercise performance, assessment, and cueing
    5. Progressions and regressions
    6. Sample programs
* **Similarities to prior job analyses and exam domains of previously NCCA-accredited CPT exams:**
  + **NFPT:** Training Program Development, Implementation, and Modification 33%
  + **NESTA:** Exercise Applications and Instruction 9.8% and Assessment and Injury Prevention 18%
  + **NCSF:** Screening and Evaluation 12% and Training Instruction 14%
  + **NASM:** K23, K26, K34, K35, K37, K40, K42, K46, K54 – K60 40%
  + **ACE:** Domain 1: Client Onboarding and Assessment (Task 3 of 4); Domain 2: Program Desing and Implementation (Tasks 2, 3, & 4); Domain 3: Program Modification and Progression (Task 3) 23%
  + **NSCA:** Techniques of Exercise 31%
  + **ACSM:** Domain I: Component F. 1. Knowledge of A-C; Domain II: Component B. 1. Knowledge of A; Domain II: Component F: Knowledge of A, D, & E. 21%
  + **NCCPT:** Domain IV: Program Design and Implementation; Domain V: Exercise Selection, Technique, and Training Instruction (Only A) 30%

**Domain 3: Acute Variables, Program Design, Training Goals, and Adaptations**

(Synonyms: Exercise prescription, principles of resistance training, fitness training components, training methodologies, exercise criteria)

**Brookbush Institute Acute Variable Breakdown:** This domain covers the relationship between the acute variable recommendations, program design, adaptations, and training goals.

1. Training frequency
2. Load
3. Rest between sets
4. Sets per muscle group

**All items include:**

* 1. Acute variables for endurance, strength, power, hypertrophy, body composition (weight loss)
  2. Effect on hormones, blood chemistry, cardiovascular health and performance, and markers of general health (e.g. osteoporosis, sarcopenia, etc. when research is available.)
  3. Electromyography research
  4. Effect on older populations, adults, and younger populations (less than 18 years of age)
  5. Effects on novice and experienced exercisers (and college and professional athletes)
  6. Sample programs
* **Similarities to prior job analyses and exam domains of previously NCCA-accredited CPT exams:**
  + **NFPT:** Fitness Components 23%
  + **NESTA:** Program Design 16%
  + **NCSF:** Exercise Programming 29%
  + **NASM:** K2, K44 – 46, K48, K50, K53 21%
  + **ACE:** Domain 2: Program Desing and Implementation (Task 2); Domain 3: Program Modification and Progression (Tasks 1, 2, & 3) 27%
  + **NSCA:** Program Planning 32%
  + **ACSM:** Domain II: Component B. 1. Knowledge of A, B, E, F; Domain II: Component F: Knowledge of A, C 20%
  + **NCCPT:** Domain IV: Program Design and Implementation 25%

**Training Goals and Adaptations (Sub-domain of domain 3):**

**Brookbush Institute Training Goals:** This domain covers the body’s adaptation to strength, power, muscle endurance, and stability training.

1. Concepts, physiology, and principles of power (high-velocity training)
   * 1. Neural adaptations
     2. Muscle fiber adaptations
     3. Hormone response
     4. Training modalities
     5. Strength vs. power
     6. Power program design

**Did you duplicate some of these percentages from above… I think you should make that clear?**

* **Similarities to prior job analyses and exam domains of previously NCCA-accredited CPT exams:**
  + **NFPT:** Fitness Components 23%
  + **NESTA:** Program Design 16.4%
  + **NCSF:** Exercise Programming 29%
  + **NASM:** K35, K37 – K41, K53, K55, K60 21%
  + **ACE:** Domain 2: Program Desing and Implementation (Task 1, 2, 3); Domain 3: Program Modification and Progression (Tasks 1, 2, & 3) 27%
  + **NSCA:** Program Planning 32%
  + **ACSM:** Domain II: Component A. 1. Knowledge of D & E; Component B: 1. Knowledge of F, G; Component D. 1. Knowledge of F, G, H. and 2. Knowledge of A, D. 20%
  + **NCCPT:** None

**Domain 4: Additional Topics**

**Brookbush Institute Additional Topics:** This covers additional topics that do not fit previously listed domains; however, may be relevant to the job of personal training.

1. Concepts, physiology, training modalities, and principles of stability training
   * 1. Lower body stability training
     2. Upper body stability training
     3. Core training
     4. Unstable surfaces vs. unstable loads
2. The effect of exercise on:
   * 1. Blood chemistry (hormones, lipids, growth factors, etc.)
     2. Cardiorespiratory changes (cardiovascular performance, markers of general cardiovascular health, cardiovascular disease, etc.)
     3. Osteoporosis/Bone mineral density
3. Scope of practice

* **Similarities to prior job analyses and exam domains of previously NCCA-accredited CPT exams.**
* **Also notated is the varying additional content in the CPT exams across certifying bodies.** 
  + **NFPT:** Maintaining scope of practice 5%
  + **NESTA:** Nutrition, exercise psychology, and business application 41.2%
  + **NCSF:** Nutrition and professionalism & risk management 10%
  + **NASM:** Domain 1: Basic and Applied Science and Nutritional Concepts (k2 d, e, g; k6 – k16); Domain 5: Client relations and behavior (k62 – 68); Domain 6: Professional Development and Responsibility (k69 – 78). 22%
  + **ACE:** Domain IV: Risk Management, Professional Conduct, and Ethical Business Practices Task 1 (scope of practice and confidentiality), Task 2 (Code of Ethics), & Task 3 (business and marketing). 19%
  + **NSCA:** Program Planning C: Training adaptations, 2b – d (cardiovascular, metabolic, and endocrine); D: Training adaptations, 1 (special populations); Safety, Emergency Procedures, and Legal Issues 14%
  + **ACSM:** Domain 1: Component C Knowledge of 1 (cardiovascular disease) and 2 (PAR-Q); D Knowledge of 1 (SMART Goals); F Knowledge of 1 c (response of endocrine and cardiorespiratory system); Domain III: Leadership and Client Education; Domain IV: Legal and Professional Responsibilities 34%
  + **NCCPT:** Domain II: Nutrition; Domain VI: Professional Practice and Responsibility 20%

This systematic review (SR) compares the percentage of content in each domain for each of the 8 previously NCCA-accredited personal training exam providers (all providers) across various domains. This included assessing the mean percentage for each domain and standard deviations. Further, each mean was compared to the Brookbush Institute’s percentage, and a note was made about the extremes in each domain.

**Domain 1: Functional Anatomy and Exercise Physiology:** The mean percentage of total content for all providers was 26%, with a standard deviation of 7.3%. The Brookbush Institute’s percentage for this content was 32% with an actual difference from the mean of 6.0%, falling within one standard deviation. The most extreme differences were NESTA with an actual difference of 11%, and NASM with an actual difference of 9%, both exceeding 1 standard deviation.

**Domain 2: Exercise Selection, Assessment, Cueing, Progression, and Regression:** The mean percentage of total content for all providers was 30%, with a standard deviation of 5.5%. The Brookbush Institute’s percentage for this content was 30% with an actual difference of 0%, falling within one standard deviation. The most extreme differences for Domain 2 were ACSM with an actual difference of 9% less content, and NASM with an actual difference of 10% more content, both exceeding 1 standard deviation and contributing to significant variation.

**Domain 3: Acute Variables, Program Design, and Training Goals**: The mean percentage of content for all providers was 25%, with a standard deviation of 4.8%. The Brookbush Institute percentage for this content was 28%, with an actual difference of 3%, again falling within 1 standard deviation. The most extreme differences for Domain 3 were NESTA with 8% more content, and NSCA with 8% less content, both exceeding 1 standard deviation and contributing to significant variation.

**Domain 4: Additional Topics**: It was noted that among all providers, there was significant variability in the topics covered. A minority of certifications covered topics such as stability/balance training, nutrition, business coaching, special populations, marketing, calculating target heart rate, psychology, legal issues, scope of practice, etc. Because these topics were represented by half or fewer of all providers they were included in additional topics

The mean percentage of content for all providers was 21%, with a standard deviation of 11.2%. The Brookbush Institute percentage for this content was 10%, with an actual difference of 11%, again falling within 1 standard deviation. The most extreme differences for Domain 3 were ACSM with 13% more additional content, and NESTA with 20.2% more additional content, both exceeding 1 standard deviation.

**In summary,** these findings suggest that the Brookbush Institute's exam and content are similar to all providers, with statistically similar proportions for each domain. This should ensure that the Brookbush Institute’s exam is in alignment with the “industry standard” that has been set by prior published job analyses and accredited exams. Additionally, this SR demonstrates that several certifications are not congruent with the majority of the industry. Specifically, NESTA exhibited significant deviations from the mean for 3 domains, NASM and ACSM exhibited significant deviations for 2 domains, and NSCA exhibited significant deviations for 1 domain. The table below summarizes this information.

**Comparison of Domain Percentages to other NCCA-approved CPT exams**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Certification*** | **Domain 1:** Functional Anatomy and Muscle Physiology | **Domain 2:** Exercise Selection, Assessment, Cueing, Progression, and Regression | **Domain 3:** Acute Variables, Program Design, and Training Goals | **Additional Topics:**  Hormones, Cardiorespiratory Adaptations, Business, Ethics, Nutrition, Legal Issues, Psychology, Scope of Practice |
| ***Brookbush Institute*** | ***32%*** | ***30%*** | ***28%*** | ***10%*** |
| ***NFPT*** | ***39%*** | ***33%*** | ***23%*** | ***5%*** |
| ***NESTA*** | ***15%*** | ***27.8%*** | ***16%*** | ***41.2%*** |
| ***NCSF*** | ***31%*** | ***30%*** | ***29%*** | ***10%*** |
| ***ACE*** | ***31%*** | ***23%*** | ***27%*** | ***19%*** |
| ***NASM*** | ***17%*** | ***40%*** | ***21%*** | ***22%*** |
| ***NSCA*** | ***23%*** | ***31%*** | ***32%*** | ***14%*** |
| ***ACSM*** | ***25%*** | ***21%*** | ***20%*** | ***34%*** |
| ***NCCPT*** | ***25%*** | ***30%*** | ***25%*** | ***20%*** |
|  |  |  |  |  |
| ***Mean:*** | ***26%*** | ***30%*** | ***24%*** | ***21%*** |
| ***Standard Deviation*** | ***7.3%*** | ***5.5%*** | ***4.9%*** | ***11.2%*** |
| ***Confidence Interval*** | ***5.1%*** | ***3.8%*** | ***3.4%*** | ***7.8%*** |

Domain 4: Mean 21% + 7.8%

**NCCA Accredited Organizations Job Analysis Bibliography:**

* **NFPT**: https://nfpt.com/wp-content/uploads/Job\_Analysis\_summary2016.pdf
* **NESTA**: https://pft.nestacertified.com/wp-content/uploads/2013/09/NESTA-CMG-JTA-Report.pdf
* **NCSF**: https://www.ncsf.org/pdf/NCSF\_2021\_Annual\_Exam\_Report.pdf
* **NASM:** https://www.nasm.org/docs/default-source/PDF/nasm-cpt-executive-summary-job-task-analysis.pdf?sfvrsn=2
* **ACE**: https://acewebcontent.azureedge.net/assets/certification/pdfs/CPT-Exam-Content-Outline.pdf
* **NSCA**: https://www.nsca.com/contentassets/53ec33293e1c4551be4153186d4b2052/nsca-cpt-explanation-letter.pdf
* **ACSM:** https://www.acsm.org/docs/default-source/certification-documents/cpt/acsm-certified-personal-trainer-exam-content-outline-2022.pdf
* **ISAA**: https://assets.ctfassets.net/qw8ps43tg2ux/7KxejJj5WXgNhleXZrzZo4/c789e3aa043335ceb9641ad2d2accf81/nccpt-candidate-handbook.pdf