What is claimed:

1. A method for designing a fiber-composite part, the method comprising:

defining a geometry of the part and forces to which the part will be subjected;

determining stress contours of the part based on the geometry and the forces;

generating an idealized fiber map from the stress contours, wherein a direction of fibers in the idealized fiber map aligns with the stress contours of the part;

defining a plurality of constraints applicable to fabrication of the part; and

generating a first process-compensated preform map by modifying the idealized fiber map by the constraints, wherein the first process-compensated preform map provides the size, shape, orientation, and number of preforms that are required for fabricating the part.

2. The method of claim 1 further comprising placing preforms, having the size and shape of the preforms in first process-compensated preform map, in a mold, wherein the preforms are placed in the mold in accordance with the orientation specified in the first process-compensated preform map.

3. The method of claim 2 further comprising molding the part, by applying heat and pressure to the preforms in the mold, in accordance with compression molding protocols.

4. The method of claim 3 further comprising testing the part to determine at least one performance measure of the part.

5. The method of any of the preceding claims wherein defining constraints further comprises applying a weighting to at least some of the constraints, wherein the weighting affects at least one of the size, shape, and orientation of the preforms appearing in the first process-compensated preform map.

6. The method of claim 5 wherein after generating the first process-compensated preform map, the method further comprises:

altering the weighting of at least one constraint of the plurality of constraints; and

generating a second process-compensated preform map, wherein at least one of the size, shape, orientation, and number of preforms therein is different than for the preforms in the first process-compensated preform map as a consequence of the altered weighting.

7. The method of claim 4, and further comprising varying at least one constraint of the plurality of constraints over a range, wherein for each variation in the constraint, a part is fabricated based on a generated process-compensated preform map, and the part is tested to obtain a performance measure, wherein, the constraint is sufficiently varied so that the range encompasses:

(i) a first value of the constraint at which the part exhibits a maxima in the performance measure; and

(ii) a second value of the constraint at which the performance measure of the part falls below an acceptable value.

8. The method of claim 7, and further comprising selecting, as a design for the composite part, the process-compensated preform map corresponding to a value of the constraint falling within the range defined between and including the first value and the second value.

9. The method of claim 7, and further comprising selecting, as a design for the composite part, the process-compensated preform map corresponding to the first value of the constraint, thereby providing a design for best part performance.

10. The method of claim 7, and further comprising selecting, as a design for the composite part, the process-compensated preform map corresponding to the second value of the constraint, thereby providing a design for optimized fabrication efficiency.